

CTO

THE MAGAZINE FOR INFORMATION EXECUTIVES

JUNE 15, 1996

EIGHT DOLLARS

BELGIUM BF240

FRANCE FR40

GERMANY DM12

ITALY L13,000

JAPAN ¥780

NETHERLANDS G13

SPAIN P1000

SWITZERLAND SFR10

UNITED KINGDOM £5

SPECIAL FOCUS

Will SAP Make Or Break Your Company?

**How To Profit From
This Powerful Enterprise Software
Without Losing Your Shirt**

ALSO INSIDE

**CSC's Ninth Annual Survey
of Critical IS Issues**

AN INTERNATIONAL DATA GROUP PUBLICATION

**Autodesk Inc.'s
Bill Kredel**



If technology keeps moving

Thanks to computers, companies have more information about their business than ever. But they often seem to know less about what customers really want. All that data sitting in all those computers is hard to get to. And hard to use for making decisions.

What's needed are ways to help you *manage* information as a business asset that contributes to success. Unisys provides those kinds of solutions. Our information management approach lets you tap the value of data and use it to benefit customers and move your enterprise forward.



forward, what's holding you back?

We're also one of the few companies that has both the technology and services to effectively integrate your many systems. Which can further help you cut costs, generate revenue and serve customers. To learn more, contact us today.

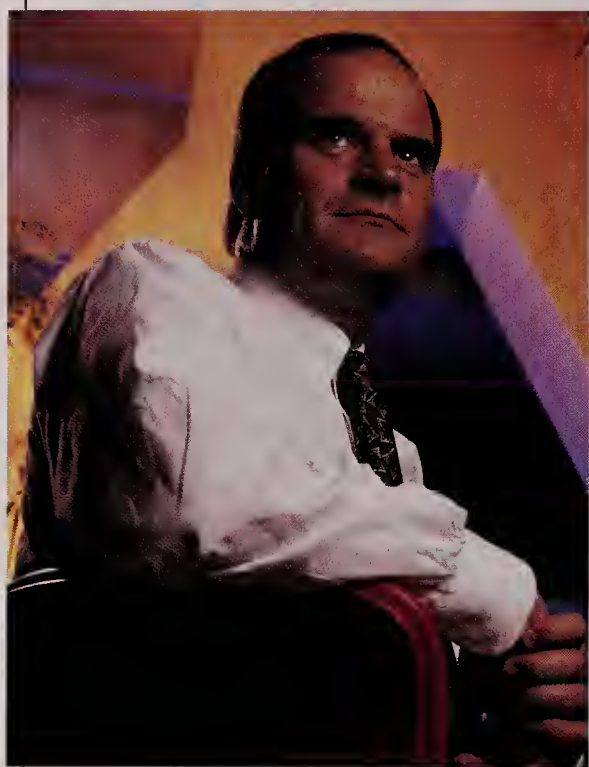
<http://www.unisys.com/adv> or 1-800-874-8647, ext. 222

UNISYS

The Information Management Company

CIO

VOLUME 9, NUMBER 17



SAP happy 34
Cover photo by Cindy Charles

SAP SPECIAL FOCUS

THE TOLL OF A NEW MACHINE

ENTERPRISE SOFTWARE STRATEGIES

Ready or Not

34

CIOs worry that installing SAP software will blow their budgets—and their careers—to smithereens. But does the problem lie in the software? Or are CIOs caught up in a tangle of multinational business processes that threaten their companies' plans to implement SAP?

By E.B. Baatz

Flipping the Switch

43

What's the best way to restructure your organization's processes? Three companies take different approaches to implementing SAP.

By Christopher Koch



"Brilliant"
debut 43

FEATURES

RETAIL BANKING

70

Banks on Balance

Retail banking is moving out from behind marble counters and glass teller cages into a customer-driven future of made-to-order financial products and swifter service.

By Mickey Williamson

PREPARING
FOR CHANGE

SECURITY

84

The Enemy Within

Security isn't just for companies using the Internet. Corporations must figure out how to protect themselves from the inside out.

By Anne Knowles

Feeling sheepish
about security?
84



MORE ►►►

The only network storage systems that won't box you in.

The last thing a data network storage system should make you feel is trapped. So to keep you ahead of the game, AT&T CommVault developed a fully integrated line of network storage management solutions that offers optimum flexibility. Backed by the incomparable AT&T reputation, our data network storage systems can accommodate more server platforms than any other storage systems—including GIS, Sun, Tandem, HP, IBM, SGI, DEC, Auspex and many more. From automated backup and retrieval, to large database storage management, to hierarchical storage management and on-line/near-line archiving, we provide an extensive selection of unique products and services to meet any network storage need. And, your

system will be continually supported by the most extensive range of options, offering you the greatest flexibility and growth. Accepting full-system responsibility, our service/support program is unique within the industry. By being the single-point-of-contact, our highly-trained technicians are able to provide the most responsive service and support. By offering a complete solution, our systems help manage all your network storage devices more efficiently and with greater data integrity—reducing new system costs, increasing user productivity and eliminating the risk of unauthorized file access. So choose the data network storage systems that offer you the most freedom—AT&T CommVault.



For more information, call us at 1 (800) 331-6207, fax (908) 935-8040, or visit our web site at <http://www.att.com>

UNIX • Novell • Banyan • Windows NT • VMS • OS/2 • Lotus Notes



**Imagine changing a tire
at over 200 miles an hour.**

An unreasonable demand? If you're an IS manager, you face the equivalent every day. And tomorrow, you may be asked to replace the engine. Or change the transmission. And don't forget, your business can't slow down. Fortunately, there's ObjectStar,TM software that makes the impossible possible. ObjectStar allows you to replace, enhance or incrementally renew your business-critical applications. And quickly move or distribute them wherever they are needed.



From servers, to mainframes, to desktops. While you and your enterprise remain in the race. And, yes, there is a track record. Kemper National Insurance Companies, Marks & Spencer, EDS,[®] and Isuzu, to name just a few. For case histories, and your own test drive, please call us at 1-800-ANTARES. Let us show you how ObjectStar can help you keep your foot to the floor.

Welcome to ObjectStar



ObjectStar gives IS the most reasonable tool to meet the most unreasonable demands. ObjectStar supports MVS, HP-UX, IBM AIX, Sun Solaris, Windows, and Windows NT.

©1996 Antares Alliance Group. Antares, Antares Alliance and ObjectStar are trademarks of Antares Alliance Group. EDS is a registered service mark of Electronic Data Systems Corporation. All other trademarks are the property of their respective owners.



Making a list and checking it twice
28

FEATURES (CONT.)

STORY INDEX

94

Six Months in Review

An index of all major articles published in *CIO* in the first six months of 1996, including a cross-reference by article type.

COLUMNS

INVENTORY MANAGEMENT

28

INSIGHTS: WATCH YOUR ASSETS

An asset inventory can supply a basis for drafting budgets, implementing upgrades and supporting users better. But executing the inventory is not a trivial process.

By Joe Caston

I.T. COSTS

102

GARTNER VIEW: PC LAN COSTS

Best practices can lower your total cost of ownership and help stop the budgeting black hole.

By Dave Cappuccio and Bill Kirwin

ISSUES SURVEY

112

OUTLOOK: CUSTOM TAILORING

Customer needs are driving IS priorities like never before, according to the ninth annual CSC Survey of IS critical issues.

By Robert Savoia



Hate mail?
16



Not well trained
16



World-class performance
16

DEPARTMENTS

Editor's Letter

10

Publisher's Letter

14

Trendlines

16

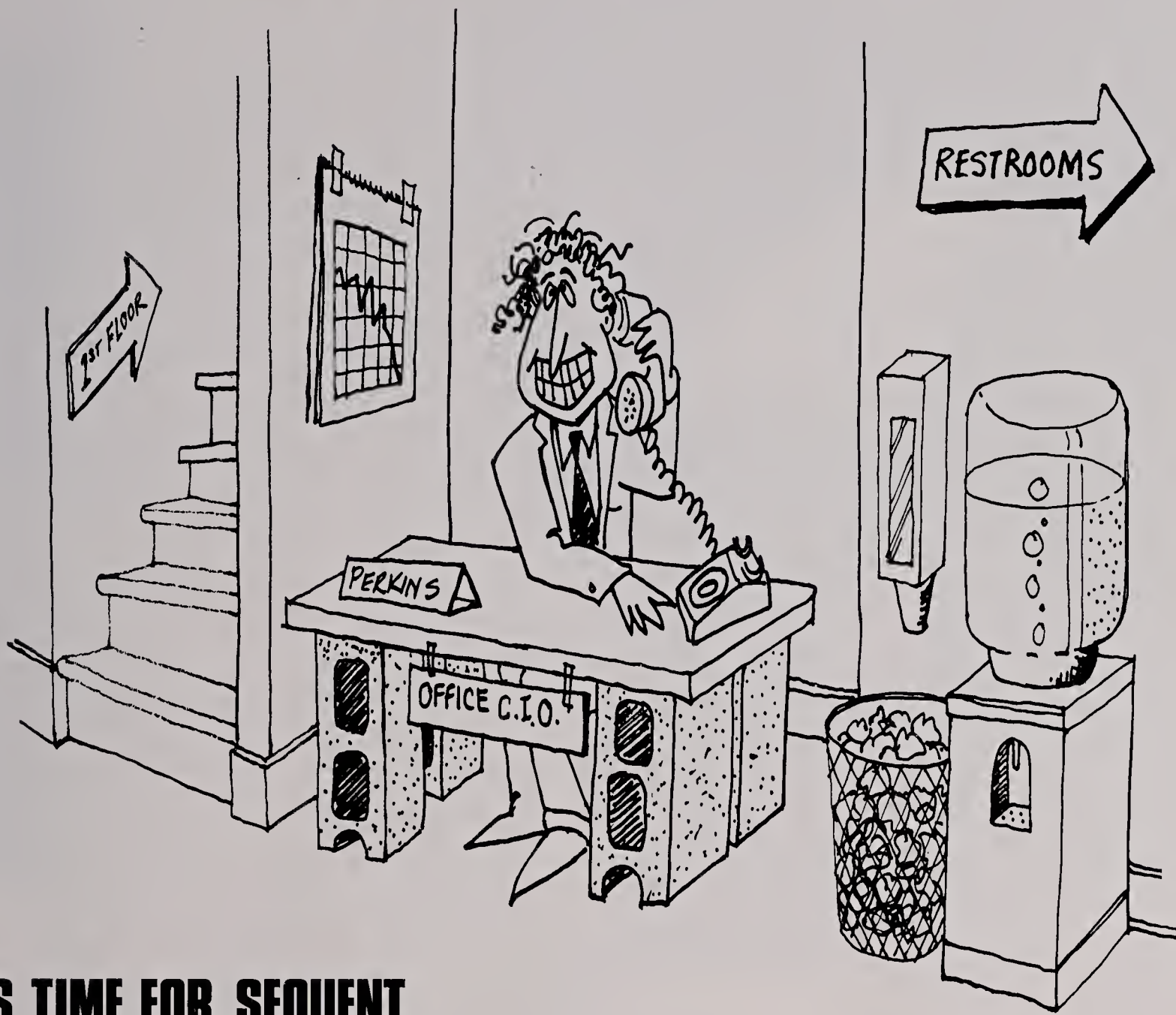
- Almost like being there
- E-mail overload
- Textually speaking
- Train in vain
- Net searching
- Worldly Web site
- Off the shelf



Index

110

"BUYING THE **RIGHT** COMPUTER CAN MOVE YOU IN THE WRONG DIRECTION."



IT'S TIME FOR SEQUENT.



You've got terabytes of data, hundreds, perhaps thousands, of demanding users. An enterprise hungry for a highly-available, scalable and manageable open systems solution. And a management team that expects you to recommend a reassuring name like IBM, HP, or DEC.

If you give them the *right* name, rather than the right solution, you,

your company, and your career, could all be in for a very big, very expensive let down. In the universe of large, complex open systems solutions, IBM doesn't rank number one. (And neither do any other famous names.) We do. We're Sequent Computer Systems.

With 7,500 installed systems worldwide, Sequent runs some of the biggest applications around the globe. What

we lack in brand identity, we make up for in expertise. And a track record for success. We work with many of the world's largest, fastest moving companies. Solving the big open systems IT challenges companies like IBM call impossible.

Our customers say we're the best at our business. We can prove it. To you...to your management team.

Some say it takes a lot of courage for a CIO like you to call in a company like Sequent. We'd call it a career decision. Call us at 1-800-257-9044. Visit our internet address at <http://www.sequent.com/>.

SEQUENT
Big Open Systems That Work

**THERE IS A
REASON WHY FIVE
OF THE BIG SIX
ACCOUNTING
FIRMS BUY DELL.**

"Risk" is hardly an accountant's favorite word. So it's instructive that our Big Six customers have invested over \$56 million in Dell PCs in the past 12 months.

Is it because we custom-build in ISO 9002 certified facilities? Because we guarantee



network compatibility? Because we have a nationwide army of local account executives and systems engineers?

Whatever the reason, it's probably the same one that explains why 6 of the 8 biggest airlines, 12 of the 13 largest telecommunications

companies, 4 of the 5 largest mutual insurance companies — in fact, 80% of the Fortune 500 — buy from us.

So if you've been looking for a computer company that understands big business, Dell's the place to land.

DELL®

TO ORDER

800-285-8961

<http://www.dell.com>

Mon-Fri 7am-9pm CT • Sat 10am-6pm CT
Sun 12pm-5pm In Canada* call 800-839-0148

Keycode #13020



DELL® LATITUDE® XPi P133ST

133MHz PENTIUM® PROCESSOR

- 11.3" SVGA Active Matrix Color Display
- 16MB RAM/810MB HDD
- PCI Bus Architecture with 256KB L2 Cache
- Smart Lithium Ion Battery with Five Hours of Battery Life*
- New 128-bit High Performance Video
- Integrated 16-bit Sound
- 28.8 XJACK® Modem/Carrying Case
- 3 Year Limited Warranty†

\$4599

Product Code #600200

DELL LATITUDE XPi P100SD

100MHz PENTIUM PROCESSOR

- 10.4" SVGA Dual Scan Color Display
- 8MB RAM/810MB HDD
- PCI Bus Architecture with 256KB L2 Cache
- Smart Lithium Ion Battery
- New 128-bit High Performance Video
- Integrated 16-bit Sound
- Infrared Port for Wireless Connectivity
- 3 Year Limited Warranty

\$3199

Product Code #600201

DELL POWEREDGE™ XL 5133-4

133MHz PENTIUM PROCESSOR

- 32MB ECC RAM
- 4GB Fast/Wide SCSI-2 HDD
- 15TX Monitor (13.7" v.i.s., .28NI)
- 3Com Fast EtherLink III EISA NIC
- 512KB Write Back Cache
- PCI Fast/Wide RAID Controller
- 6X SCSI CD-ROM



DELL OPTIPLEX™ GX 5166MT

166MHz PENTIUM PROCESSOR

- 32MB EDO RAM
- 2GB EIDE Hard Drive
- 17LS Monitor (15.7" v.i.s., .26NI)
- 2MB Video Memory with Full Motion MPEG Video
- 256KB Cache, Upgradeable to 512KB
- Integrated 3Com® EtherLink® III with Parallel Tasking
- Integrated Vibra 16 Audio
- 8X EIDE CD-ROM
- 3 Year Warranty

\$3658

Product Code #300186

DELL OPTIPLEX G 5133L+

133MHz PENTIUM PROCESSOR

- 16MB EDO RAM
- 850MB EIDE Hard Drive
- 15LS Monitor (13.7" v.i.s., .28NI)
- 1MB Video Memory, Upgradeable to 2MB
- Integrated 3Com EtherLink III with Parallel Tasking
- 3 Year Warranty

PICTURED SYSTEM

\$1965

Product Code #300185

- Server Manager Software
- 3 Year Dell BusinessCare™ Service
- 1 Year DirectLine NOS Support
- On-site† Set-up and Validation

SYSTEM NOT PICTURED

\$12,398

Product Code #200111

Prices listed are non-discountable promotional pricing only. *In Cross Country tests conducted by VeriTest, Inc., a leading independent test lab, a prototype Dell Latitude XPi P133ST lasted an average of 5 hours and 5 minutes. The VeriTest Cross Country tests simulate typical executive use of MS® Office applications with Microsoft® Windows® 95. Power management was enabled and 8MB RAM was installed. VeriTest is located in Santa Monica, CA. †For a complete copy of our Guarantees or Limited Warranties, please write Dell USA L.P. 2214 W. Braker Lane, Suite D, Austin, TX 78758. ‡On-site services provided by BancTec Service Corp. On-site service may not be available in certain remote locations. Prices and specifications valid in the U.S. only and subject to change without notice. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. Microsoft, Windows and the Windows logo are registered trademarks of Microsoft Corporation. XJACK is a registered trademark of US Robotics Mobile Communications Corporation. 3Com and EtherLink are registered trademarks of 3Com Corporation ©1996 Dell Computer Corporation. All rights reserved.



There's a fine line between clever and stupid, as Contributing Editor Leigh Buchanan is fond of saying. There's also a fine line between good information and bad. Good information (that which is rich, detailed, aimed at your interests and clearly/concisely presented) has enormous value. Bad information is a waste of time.

There are many places to cross that line: Richness and detail can easily become excessive and overwhelming. Conciseness can devolve into superficiality. The readers and staff of *CIO* tread this line every day.

Over the years, readers have told us that our articles are great treatments of the topics they cover. But readers inevitably reach a point in the story where they want to know more, where some of their questions go unanswered. This is the shortcoming of any medium whose content is fixed by space and time constraints: There are never enough pages to share everything we know about a topic, never long enough deadlines to research everything we'd like to know.

With the Web, we are finally able to overcome those limitations. This month we are launching the first in a series of "interactive articles"—online forums that grow out of an article in the print publication and that feature the article's writer and many of its sources. After you read our stories on SAP in this issue, you are invited to participate in an interactive discussion that will get beneath the surface of the articles themselves. In effect, you will have the opportunity to be both the interviewer (by posing questions to the "sources") and a source yourself. And by providing us with feedback on the format and suggestions for future topics, you can sit in the editor's seat as well.

Please join us from June 17 through July 3 at <http://www.cio.com/forums/SAP.html>. And be sure to let us know what you think of this new venture.

Editor
lundberg@cio.com



© By CIO Communications, Inc.

President and Group Publisher JOSEPH L. LEVY
Editorial Director LEW MCCREARY

Editor	ABBIE LUNDBERG
Art and Design Director	MARY L. MARSHALL
Managing Editor	RICHARD PASTORE
Senior Editor	ANNE STUART
Senior Editor	E.B. BAATZ
Associate Editor	ALICE DRAGOON
Associate Editor	ELAINE M. CUMMINGS
Associate Editor	CHERYL DAHLE
Associate Editor	PERRY GLASSER
Copy Chief	CHERYL R. DAVIS
Copy Editor	JAY F. RIZOLI
Senior Writer	CAROL HILDEBRAND
Senior Writer	MEGAN SANTOSUS
Senior Writer	CHRISTOPHER KOCH
Staff Writer	PETER FABRIS
Staff Writer	TOM FIELD
Staff Writer	HEATH ROW
Staff Writer	JENNIFER BRESNAHAN
Staff Writer	DEREK SLATER
Associate Art Director	LISA PUCCIO
Senior Graphic Designer	LINDA GOLON
Senior Graphic Designer	MICHAEL SIGGINS
Graphic Designer	HANA BARKER
Graphic Designer	KELLI WALTON
Editorial Researcher	CAROL ZARROW
Editorial Assistant	RUTH GREENBERG
Administrative Assistant	LISA JAYNE KERBER
Design Intern	NATALIYA GURSHMAN

Editor at Large	JOHN C. WHITMARSH
Contributing Editor	LEIGH BUCHANAN
Contributing Editor	ART JAHNKE
Contributing Editor	MICKEY WILLIAMSON

Contributing Writers Dave Cappuccio, Joe Caston, Bill Kirwin, Anne Knowles, Robert Savoia

VP/Marketing	CATHY O'LEARY HAYES
VP/Media Dev. & Agency Rel.	LISA BROWN
VP/Production	LORI BETH SADEWITZ
VP/Finance & Admin.	WALTER MANNINEN
VP/Circulation	CAROL A. SPACH
Chief Information Officer	BRUCE M. FRIEDMAN
Webmaster	TIM HORGAN
Manager, Network Service	DIDIER WEIZMAN
Assistant to the Publisher	DIANE MARTIN
Fulfillment Manager	SUSAN WOODWORTH
Production Manager	RESA ALTSHER
Production Associate	KATHRYN A.W. GRYBAUSKAS
Marketing Comm. Manager	MARCY L. DILL
Research Manager	BRIDGET CAMMARATA
Strategic Marketing Manager	ROBIN L. AZAR
Trade Show Coordinator	DOT CASPERSEN
Subscription Svcs. Supervisor	DENISE PERREAULT
Circulation Assistant	MARY ANN DENEALUT
Billing Coordinator	LYNN J. PALMQUIST
Finance/Admin. Specialist	CHAD MARSTON
Marketing Intern	KAREN FOGERTY

Senior VP/Exec. Programs	LYNDA ROSENTHAL
Manager, Program Services	NANCY A. O'CONNELL
Director, Program Planning	SUSAN T. MONTGOMERY
Manager, Program Operations	CYNTHIA LAIRD
Mgr., Program Mktg. Comm.	SARA E. MCGARRY
Administrator, Exec. Programs	LIZ HECHT
Administrator, Exec. Programs	MICHAEL MCPHEE
Administrative Assistant	SANDRA J. HUGHEY
Program Coordinator	BRIAN FUCE
Manager, Ancillary Products	BILL KERBER

Editorial Offices CIO Communications, Inc., 492 Old Connecticut Path, P.O. Box 9208, Framingham, Mass. 01701-9208 (508) 872-0080, FAX (508) 879-7784. Printed in the U.S.A.
Subscriber Services (800) 788-4605, FAX (508) 872-8506
List Services (800) 859-LIST
Visit our Web site at <http://www.cio.com>





The man to have on your decision support team.

● If you knew Tommy's Mom was one of your best charge card customers, you could decide to promote perfume when she took him shopping for spikes. And if such knowledge enriched every aspect of your business, all your business decisions would be better. Which is the best reason to do business with us. Our decision support systems bring the customer knowledge you need to drive your business, to your desktop.

● Whether you're deciding on promotions to increase charge card usage, evaluating

loyalty programs or lifetime value, we can provide the knowledge you need to make better customer-focused decisions.

● We start by enriching your internal customer databases with external InfoBase™ information, transforming them into an integrated customer knowledge base. The data warehouses we build make this knowledge available

enterprise-wide. Our software, tools and services make it easily accessible from desktop PCs. And our long experience has resulted in industry models that enable us to implement systems that suit your needs precisely. Quickly.

Customer-focused decision support. From Acxiom. The knowledge you need to win in the big leagues.

To Learn More, Call...
1-800-922-9466

ACXIOM®

the knowledge to drive your business

Acxiom Corporation
301 Industrial Boulevard, P.O. Box 2000, Conway, AR 72033
Email: info@acxiom.com

Before you
make sure it
in the same

Whether you realize it or not, software comes with a set of beliefs built in. Before you choose software, make sure it shares yours.

Do you believe in embracing change, rather than avoiding it? Do you believe in putting power in the hands of people, not

systems? Do you believe decisions should be made, not just by headquarters, but by those at the front lines? If you do, then you should know about software that was created with these beliefs in mind. PeopleSoft client/server software. It adapts to change quickly and

© 1996 PeopleSoft, Inc. PeopleSoft is a registered trademark and the PeopleSoft logo is a trademark of PeopleSoft, Inc.

A few of the companies who believe in PeopleSoft:

BARNETT BANKS

CANON U.S.A., INC.

DOW CHEMICAL

buy software,
believes
things you do.

economically. It makes it easier for those at the front lines to get the information they need to make better decisions. And it's flexible enough to adjust to the way you do business, not the other way around.

No wonder so many major corporations

have chosen PeopleSoft. They've discovered we have the technology, the people, and the commitment it takes to make their beliefs a reality.

To find out more, give us a call at 800-947-7753 or visit our home page at <http://www.peoplesoft.com>.



Enterprise client/server software solutions for finance, materials management, distribution, manufacturing, and human resources.

ELI LILLY AND COMPANY

EQUITABLE LIFE

HERSHEY FOODS CORPORATION

SHELL OIL CO.

SONY MUSIC

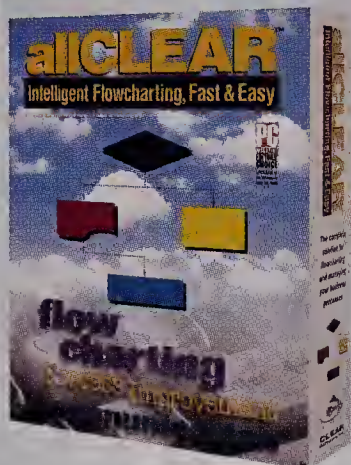
WHIRLPOOL CORPORATION

Instantly Document Corporate Policies, Procedures and Work Instructions

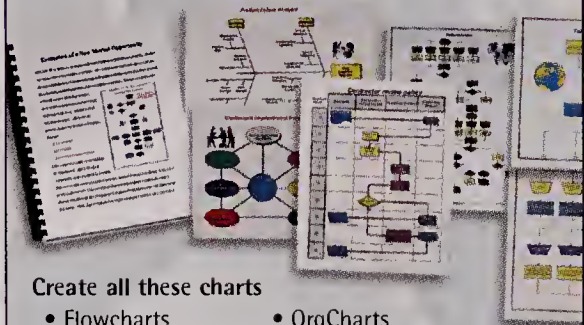
Have you ever drawn flowcharts for policies, procedures or process flows by hand...or with a PC drawing program?

If so, break your pencil in half...and delete those antiquated drawing programs from your hard drive.

Introducing allCLEAR.



A better, faster, easier way to create all the flowcharts you need...integrate them into any written document...and rapidly revise them whenever your policies, procedures or processes change.



Create all these charts

- Flowcharts
- OrgCharts
- Network Diagrams
- TQM Diagrams
- Fishbone Diagrams
- Procedure Charts

It's fun, easy to use and it's guaranteed!
So, stop wasting time and start churning out professional diagrams, like a pro, in minutes... even if you can't draw a straight line!



Call today to get your FREE report on how flowcharts can improve your processes.

1-800-338-1759



<http://www.clearsoft.com>
617-965-6755

LETTER FROM THE PUBLISHER

As reported by Contributing Writer Anne Knowles in this issue of *CIO*, organizations both large and small are struggling to find the most effective ways to protect their information infrastructures from the wiles of elusive computer hackers. Threats to computer security abound, and the stakes are high.

Although statistics on data security breaches are tough to come by, research indicates that computer crime has already hit nearly 95 percent of businesses and is increasing dramatically. And the Internet and the World Wide Web add a new dimension to the already complex security puzzle.

Such challenges pave the way for opportunities both for the CIO, who must take the lead in articulating, communicating and implementing a solid plan to protect IT assets, and for the IT companies that provide critical product and service solutions to address security challenges. It's up to all of us to share information that can lead to insights into this critical issue.

To learn more about the trends and opportunities in IT security, be sure to see the feature that begins on Page 84. We also encourage you to tell us about your worst security nightmares and the solutions you've implemented to address them. We'd like to share them with all of our readers. Please feel free to send me an e-mail at jlevy@cio.com or call me at 508 935-4601.

William L. Levy

P.S. Internet security strategy is just one of many critical topics to be addressed at the first annual WebMaster Perspectives Conference, Aug. 11-14 at the Westin St. Francis Hotel in San Francisco. For more information, visit our Executive Programs Web pages at <http://www.cio.com/conferences/proghome.html> or call our Executive Programs team at 800 355-0246. We encourage you to learn more about the many upcoming CIO Executive Programs by bookmarking the site and visiting us on the Web.



Board Chairman: PATRICK J. MCGOVERN
President: KELLY CONLIN
Chief Operating Officer: JAMES CASELLA
Executive Vice President: WILLIAM P. MURPHY

The NCR Scalable Data Warehouse.



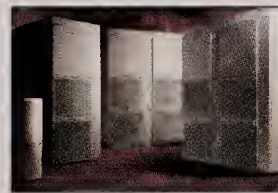
3 out of the top 5 airlines have taken off
with our data warehouses.

**#1 IN DATA
WAREHOUSING**

Looking to use data warehousing to gain a competitive edge? Choose NCR, the company that IDC says is number one worldwide with 50% of the market.*

We can get you off to a flying start with a NCR data warehouse solution that is just right for your needs. With industry-leading databases like Teradata®, Oracle®, Informix®, and Sybase®.

For more information about NCR's scalable data warehouse solutions and our highly scalable WorldMark™ servers, call 1 800-CALL-NCR, ext. 3000. Or experience our data warehousing capabilities firsthand at <http://www.ncr.com>



TRENDLINES

MESSAGE MANIA

MAIL DOMINATED CULTURE

A glut of e-mail messages is clogging up information systems everywhere. And while senior executives who still have their trusty secretaries to vet mail and phone calls may not be aware of the problem, anyone who has spent Sunday evenings sorting through a throng of e-mail messages so that Monday morning won't be so daunting knows that e-mail overload is reaching crisis proportions.

"It's not just an annoyance to the individual; from a senior-executive perspective the issue is one of organizational performance and productivity," says David De Long, author of a recently published Ernst & Young LLP study entitled "Coping with Communication Overload: The New Productivity

Crisis." (For a copy of the paper, contact E&Y's Center for Business Innovation in Boston at 617 742-2500.) "E-mail is so easy to send and the cost is so low," says De Long. "But the cost of receiving and processing—the time that it takes to sort through e-mails—is

"I'm concerned [about e-mail overload]. I used to worry about keeping my in/out boxes near zero. Now I let them rack up hundreds of messages... and occasionally go in and clean them. Downstream, all e-mail should go into a live database that allows users to add fields. Then you simply don't end up filing. It's already done."

—Gordon Bell, Senior Researcher, Microsoft Corp. Bay Area Research Center

DERAILED TRAINING

Here's some bad news for companies that sink scads of moola into training courses that purportedly teach people how to use new

software: They don't work.

At least not nearly as well as

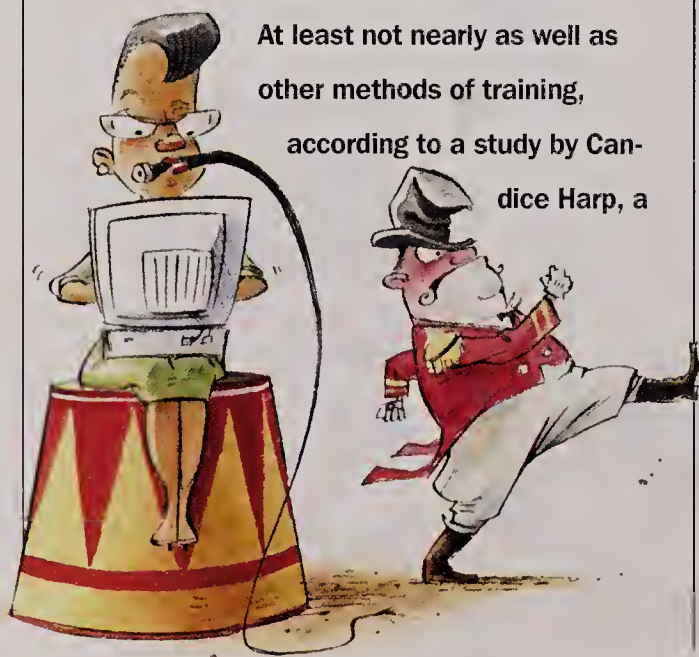
other methods of training,

according to a study by Candice Harp, a

consultant in Atlanta, and professors John Satzinger from the University of Georgia and Sandy Taylor from the University of Wisconsin.

The study, which surveyed 263 users about which training methods they thought were most useful, identified the following approaches as the most effective: allowing time for users to experiment and "play" with new software on their own; consistency within a program; asking coworkers for assistance; and reading the prompts generated by the software during various procedures.

Rated least useful: calling the in-house help desk; attending a formal training session; using reference cards or keyboard templates; and following computer-based training courses. ■



still very high."

And according to a recent story in The Conference Board's *Across the Board* magazine, companies are coping with the crisis in a variety of behavioral, as well as technical, ways. For example, at Computer Associates International Inc. in Islandia, N.Y., Chairman and CEO Charles Wang orders the e-mail system shut down from 10 a.m. to noon and from 2 to 4 p.m. "Mr. Wang wanted us to focus on voice and face-to-face communication during the day because an e-mail message carries only a little bit of information, while one's voice inflection and body languages says so much more," says Marc Sokol, vice president of advanced technology. Of course, going cold turkey on e-mail, even for just four

Get the competitive edge!
Subscribe today and



SAVE \$23

YES, please enter my one-year subscription (21 issues) to CIO magazine and bill me later for only \$75, a savings of \$23 off the basic rate.

NAME

TITLE

COMPANY NAME

ADDRESS

CITY

STATE

ZIP

AS96

The basic one-year subscription rate for CIO magazine is \$98. This is a domestic rate only (US and Canada). The foreign rate is \$110 prepaid in U.S. Currency.

New Subscriber



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE



Attn: Circulation Department
PO Box 9208
Framingham, MA 01701-9486



CIO Perspectives Conference

Conference Preview

IT *Turnarounds, Transformations and Recoveries*

OCTOBER 13-16, 1996

LA QUINTA RESORT • INDIAN WELLS, CA

Featuring

Gary Hamel

Ken Fugate

Steve Hanna

Plus

Brewing a Hospitality Spinoff

Value in Floundering Firms

Becoming a Strategy Activist



CIO Communications, Inc. • 492 Old Connecticut Path • Framingham, MA 01701 • 800-366-0246 • <http://www.cio.com>

To enroll call 800-366-0246 or

CIO PerspectivesSM Conference

IT Turnarounds, Transformations and Recoveries

October 13-16, 1996 • La Quinta Resort • Indian Wells, California

If history is written by the winners, finding the lessons from people willing to share how they extracted knowledge from defeats and converted them to successes could help make winners of us all.

The next *CIO Perspectives* conference, **IT Turnarounds, Transformations and Recoveries**, will provide new insights for CIOs, CEOs, CFOs, and other executives whose companies are restructuring, anticipating radical business process transformation or recovering from trauma. Presentations will feature compelling case studies focusing on how IT enabled (or hindered) the outcome.

Ken Fugate, CIO, First Nationwide Bank; **Steve Hanna**, CIO, Host Marriott Services Corporation; **John Brighton**, CIO, U.S. Healthcare; and **Dr. Richard Tedlow**, MBA Class of 1957 Professor

of Business Administration, Harvard Business School, are among the practitioners who will discuss their experiences.

Our keynote presentation will be delivered by

Dr. Gary Hamel, Professor, London Business School and Chairman, Strategos. **Jim Wetherbe**, Director, MIS Research Center, University of Minnesota, and Federal Express Professor of Excellence, Director, Center for Cycle Time Research, University of

Memphis, will once again moderate the conference.

IT Turnarounds, Transformations and Recoveries will be held October 13-16, 1996 at the La Quinta Resort in Indian Wells, California. To participate in this conference, please visit our Web site at <http://www.cio.com> or complete the enrollment form on the back of this page and fax it to us at 508-879-7720. You can also call us at 800-366-0246.

"An absolute must for information technology executives struggling to stay current in this dynamic virtual economy. The CIO conference cleverly combined learning, networking and a look into the future."

Regenia David
Vice President, Information Technology
American Express Financial Advisors, Inc.

Concurrent Sessions

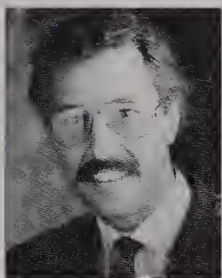
On Monday and Tuesday, a series of concurrent sessions will be offered by our Corporate Hosts. Participants can attend up to six concurrent sessions.

Companion Program

Participation in the companion program includes all scheduled meals, receptions, entertainment, a special companion breakfast, stretch and tone class and a choice of a golf clinic or a tour to Palapas, a hands-on artists' village.

visit our Web site at <http://www.cio.com>

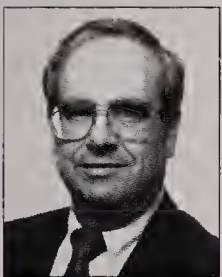
Featured Presenters



Dr. Gary Hamel
Keynote
Professor
London Business School
Chairman
Strategos



Steve Hanna
CIO
Host Marriott Services
Corporation



Ken Fugate
CIO
First Nationwide Bank



Jim Wetherbe
Moderator
Director, MIS
Research Center
University of Minnesota

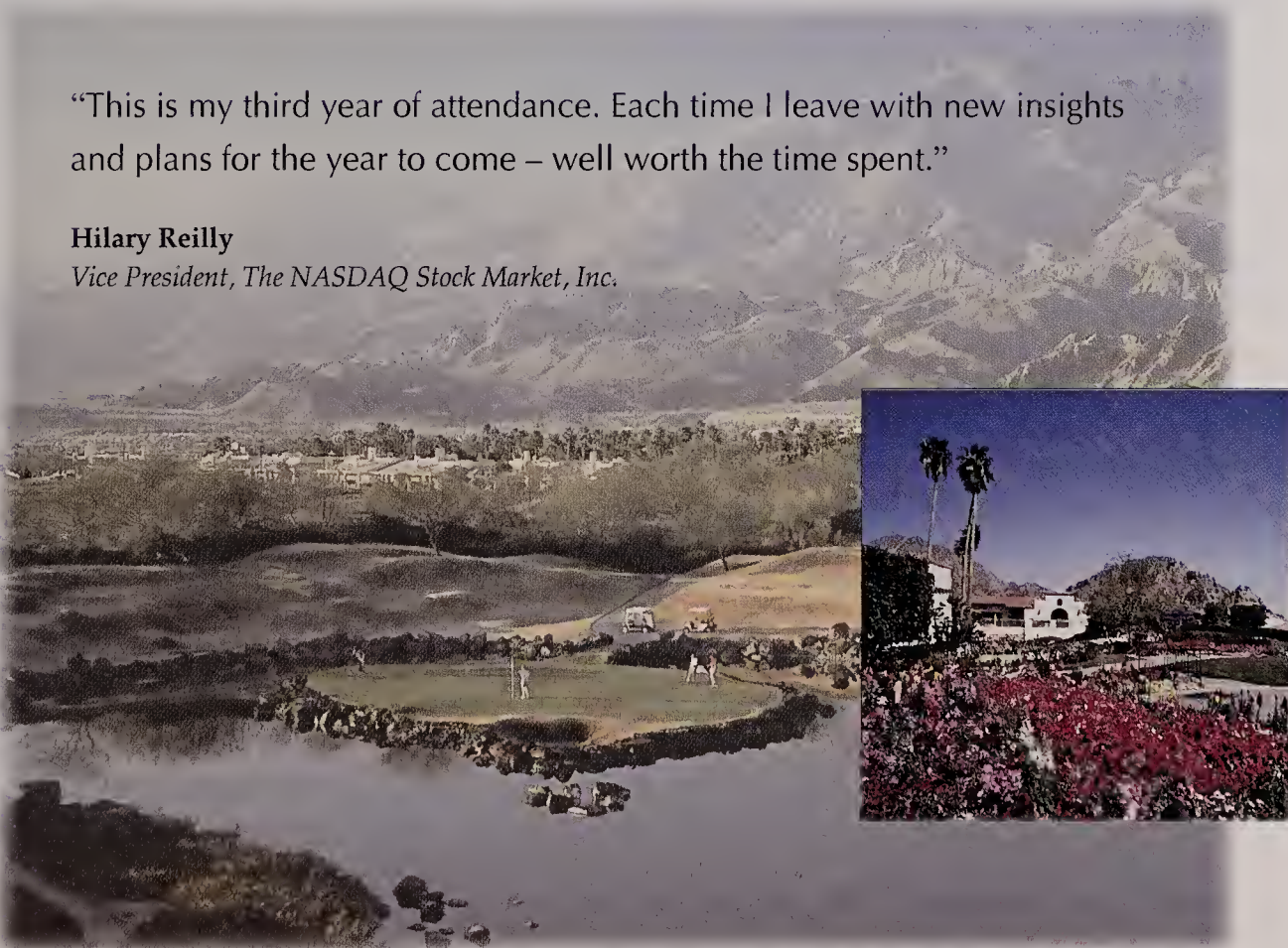
Federal Express
Professor of Excellence
Director, Center for
Cycle Time Research
University of Memphis



Dr. Richard Tedlow
MBA Class of 1957
Professor of Business
Administration
Harvard Business
School

"This is my third year of attendance. Each time I leave with new insights and plans for the year to come – well worth the time spent."

Hilary Reilly
Vice President, The NASDAQ Stock Market, Inc.



CIO

PERSPECTIVES

Corporate Hosts

ACXIOM

Antares
ALLIANCE GROUP

CENTURA
SOFTWARE CORPORATION
formerly known as GUPTA

CISCO SYSTEMS

Data General

DELL

EDS

ERNST & YOUNG LLP

hp HEWLETT®
PACKARD

Hyperion
SOFTWARE

IBM

INFORMIX

intel®

LBMS

LOCKHEED MARTIN



PictureTel

SEQUENT



STERLING
COMMERCE

Sun

TEXAS
INSTRUMENTS

ENROLLMENT FORM



IT Turnarounds, Transformations and Recoveries

Sunday, October 13 – Wednesday, October 16, 1996

La Quinta Resort, Indian Wells, California

Please visit our **Web site** at <http://www.cio.com> or **Fax** to 508-879-7720. You can also **Call** us at 800-366-0246 or **Mail** completed form to: Executive Programs, CIO Communications, Inc., 492 Old Connecticut Path, Framingham, MA 01701

NAME		
TITLE		
COMPANY		
ADDRESS		MAIL STOP
CITY	STATE	ZIP CODE
PHONE	FAX	
E-MAIL		COMPANY WEB SITE ADDRESS
WHAT IS YOUR INDUSTRY?		
YOUR NAME AS YOU WANT IT TO APPEAR ON YOUR BADGE		
HOTEL ARRIVAL DATE		HOTEL DEPARTURE DATE
NAME OF COMPANION (IF PARTICIPATING IN COMPANION PROGRAM)		TIJ2

CHECK ALL THAT APPLY:

ENROLLMENT FEE

- ☐ **IS Practitioners/Executives**
If you are a CIO, IS executive or hold another executive position, the fee is \$1,495.
- ☐ **Government/Military**
The fee, which includes your hotel for three nights, is \$1,795. *Do not make your own hotel reservations. CIO will make them for you.*
- ☐ **Sales/Marketing/Consulting**
If you hold a sales, marketing, new business development or consulting position, the enrollment fee is \$5,000. CIO will make the final determination of this category.

OTHER ACTIVITIES

- ☐ **COMPANION PROGRAM (\$275)**
Companions must be enrolled in this program to attend any conference-related functions. Includes all scheduled meals, receptions, entertainment, companion breakfast, stretch and tone class, and a choice of a golf clinic or a tour to Palapas, a hands-on artists' village. Conference session attendance not included.
- ☐ **I will not be staying at the La Quinta Resort**

Name of alternate hotel

PAYMENT INFORMATION (Please make checks payable to CIO Communications, Inc.)

- ☐ Check enclosed ☐ Bill company
- ☐ P.O. # _____
- ☐ Credit card # _____
- ☐ AMEX ☐ VISA ☐ MC Exp. _____

Signature: _____

TO ENROLL CALL 800-366-0246

Please
Attach
Business
Card Here

ATTIRE

Casual! Please, no suits, ties or business attire!



HOTEL ACCOMMODATIONS

A block of rooms has been reserved at the La Quinta Resort. We urge you to make your reservations early by calling the hotel at 619-564-4111. Be sure to identify yourself as part of the CIO conference to receive the conference rate. Please make your reservations early and guarantee your room with a credit card, as all unreserved or unguaranteed rooms will be released on 9/20/96. Hotel reservations/cancellations and charges are your responsibility. CIO will make hotel reservations for government/military participants.

TRANSPORTATION

American Airlines is the official conference carrier. Call American at 800-433-1790 and reference Star File #S0106MA. AVIS is the official car rental provider. Call AVIS at 800-331-1600 and reference R766657.

ENROLLMENT FEES

All enrollment fees must be paid in advance of the meeting. Fee includes conference sessions, concurrent sessions, corporate host displays, conference materials and scheduled meals. Transportation, hotel and recreation are your responsibility.

CANCELLATION

You may cancel your enrollment up to 10/4/96 without penalty. No refund or credit will be given for cancellations received on or after 10/4/96. You may send a substitute in your place.

CIO reserves the right to decline enrollment to any registrant.

CIO

PERSPECTIVES

Corporate Hosts

ACXION

Antares
ALLIANCE GROUP

CENTURA
SOFTWARE CORPORATION
formerly known as GUPTA

CISCO SYSTEMS

Data General

DELL

EDS

ERNST & YOUNG LLP

hp HEWLETT
PACKARD

Hyperion
software

IBM

INFORMIX

intel

LBMS

LOCKHEED MARTIN



PictureTel

SEQUENT



**STERLING
COMMERCE**

Sun

**TEXAS
INSTRUMENTS**



IT TURNAROUNDS, TRANSFORMATIONS and RECOVERIES

OCTOBER 13-16, 1996

LA QUINTA RESORT ■ INDIAN WELLS, CA

800.366.0246

(for enrollment information)

TRENDLINES



hours of each day, wasn't exactly easy. "Quitting e-mail was like trying to quit smoking," says Sokol. "At first, it was horrible."

Rather than deal with the bother of changing behavior, some are taking a technical tack. At the White House, where technophiles Bill Clinton and Al Gore are inundated with e-mail, government techies are developing sorting software that automatically scans messages for key words and routes them to the appropriate technocrats, according to Aether Madness, the Web version of *Aether Madness: An Offbeat Guide to the Online World* by Gary Wolf and Michael Stein.

Universities, where the e-mail explosion has been loudest, are now studying the effect of communi-



cations proliferation on organizational performance. The University of Maryland's computational intelligence laboratory and computational linguistics and information processing laboratory are conducting research in information filtering. According to researcher Doug Oard, at least 22 information filtering systems developed by universities and governments around the world are available to the public.

To find out more about information filtering, check out Oard's comprehensive Web site on information filtering, with links to all the publicly available filtering tools, research papers, conferences and related Web sites at http://www.enee.umd.edu/melab/filter/filter_project.html. Just don't send him e-mail.

—E.B. Baatz

GOING FOR GOLD

It could be described as the mother of all Web sites: The official site for the Olympic Games in Atlanta will have 20,000 pages (not counting ones generated on the fly) and is expected to log more than 10 million hits per day once the torch is lit. Already, 32,000 tickets to events have been purchased using the site. More than a few Net watchers have predicted that traffic from the site might crash a section of the Inter-



net during the Games.

IBM Corp., the official IT provider for the Games and the Web site, says it doubts a crash will occur, but it has prepared carefully for the avalanche of hits, says Jose-Luis Iribarren, manager of Olympic and sports Internet systems in IBM's Worldwide Sports Office in Armonk, N.Y.

Mirror servers in Japan and Europe will help bear the load,



and IBM is adding extra lines in the portion of the Internet that it owns through Advantis, the network provider for the IBM Global Network and a joint venture of IBM and Sears. "We're doing things to make our Internet neighborhood more able to support the traffic," Iribarren says.

Whether the Olympic site pushes the Internet into overload, it is sure to make history in bringing coverage of the Games in real-time to millions. The site will include

schedules, pictures of Olympic

venues, athlete profiles and up-to-the minute event results.

The site runs on a 30-node IBM RS/6000 SP2 supported by 40GB of storage in IBM SCSI units. That setup is 300 times more powerful than a typical corporate Web server handling between 50,000 and 100,000 hits per day, Iribarren says.

If IBM does pull off the site without crashing the Net, the whole world (and World Wide Web)

will be watching. "It's a golden opportunity to showcase our technologies," Iribarren says. ■

NUMBER GAMES

By any standards, the centennial Olympic Games, which begin in Atlanta on July 19, will rack up impressive numbers in terms of people and of technology. Following are some facts and figures provided by The Atlanta Committee for the Olympic Games:

BIG PICTURE

Participating nations: **197**

Olympic medals: **1,933**

Estimated benefit to Georgia economy: **\$5.1 billion** (from 1991-1997)

PEOPLE

Athletes: **10,800**

Volunteers: **40,000**

Coaches and officials: **5,000**

Olympic visitors: **2 million**

TV spectators worldwide: **3.5 billion**

TECHNOLOGIES (partial listing)

- 80 AS/400 multiuser systems (servers)
- More than 250 LANs
- 4 S/390 servers (mainframe computers)
- 7,000 microcomputers
- 500 data lines
- 2,000 wireless computers and other system communication devices

For more information on the 1996 games, see the official Web site at <http://www.atlanta.olympic.org>.



FREE for a Limited Time...A CD ROM Preview of

The Top New Data Warehousing Software

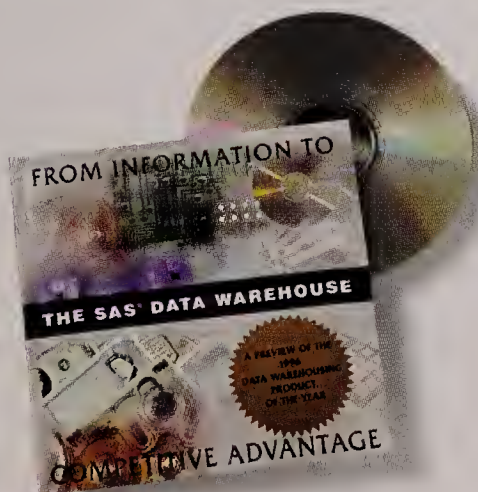
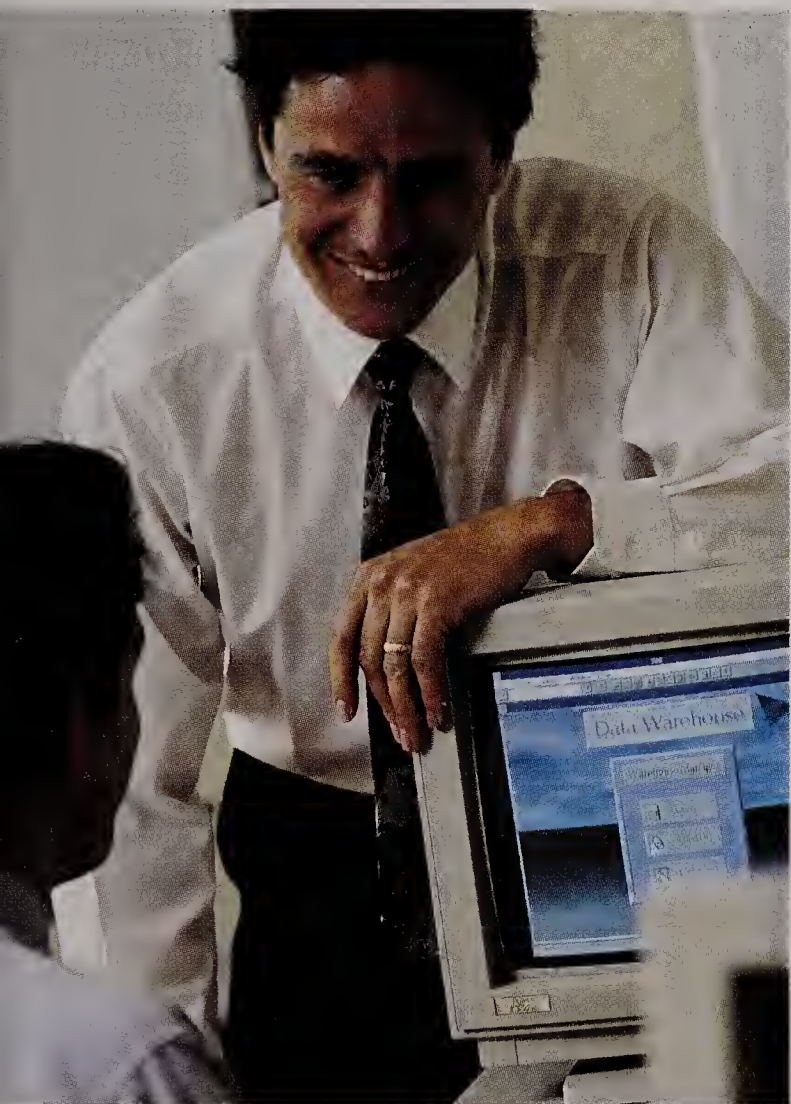
When 200,000 IS managers were asked to choose the top software for data warehousing, their answer had a familiar ring:

SAS software from SAS Institute.

As the only end-to-end solution for rapid data warehousing, SAS software delivers everything you need to manage, organize, and exploit your business data.

The tools you use to build a data warehouse are the same ones used to maintain it...run it...and change it. And what's more, everything's scalable. You can jump right into enterprise-wide information delivery applications...or start small and build on your success.

SAS software doesn't consume overhead for database features you don't need. And once you have data in the warehouse, you'll find everything you need for data query and reporting, OLAP/multi-dimensional analysis, data mining, database marketing, data visualization, and much more. It's never been easier to access your data...or to arrive at informed decisions by turning raw data into real information.



SAS Institute

Software for Successful Decision Making

Phone 919.677.8200 Fax 919.677.4444
In Canada 1.800.363.8397

You can also request your free CD ROM, and learn more about SAS seminars in your area, by visiting us on the World Wide Web at <http://www.sas.com/>

E-mail: cio@sas.sas.com

SAS is a registered trademark of SAS Institute Inc. Copyright © 1996 by SAS Institute Inc.

SAS®

Institute.

Software

for

Successful

Decision

Making.

<http://www.ascend.com>
1 800 632 8347 ext. 203



network services Internet
remote sites central sites
security & mana

access

gement

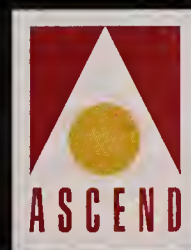
**The challenge in
Remote Networking is not
implementing the individual
building blocks, but integrating
them into a total solution.**

Remote Networking is as easy as
connecting point A to point B, isn't it?

It's just a matter of providing a
reliable, secure connection, right?

Not really. A complete solution must
provide the means to integrate the key
building blocks of Remote Networking:
remote sites, central sites, network
services, Internet access, security
and management. Actually, only one
seamless, integrated and proven
solution exists. The one that has been
chosen by 28 of the 30 largest Internet
Service Providers worldwide.

**Ascend. Remote Networking
Solutions That Work.™**



TRENDLINES

VOICE TECHNOLOGY

THE NEW SPEAKEASY

Although the Yellow Pages lets your fingers do the walking, the Net increasingly lets your fingers do the talking. As companies like VocalTec Inc. in Northvale, N.J., and Camelot Corp. in Dallas develop products such as Internet Phone and Digi-Phone that enable real-time voice communications over the In-

ternet, other companies are working to harness the Net and Web as environments for other voice applications.

With VocalTec's Internet Phone 4.0, users can append voice mail messages to e-mail. While people need VocalTec's software to talk to other Internet Phone users in real-time, the electronic voice mail messages can be played with a free program downloaded from VocalTec's Web site (<http://www.vocaltec.com/>). Motorola Inc.'s Cellular Infrastructure Group takes that a step further with a new wireless Internet service through which cellular phone subscribers can check stock reports and sports

scores, and convert them into voice messages that can be played over the phone. By the end of the year, cellular phone users will be able to receive short text messages on their handsets, check e-mail and dictate voice messages that will be converted to e-mail, says Debbie McCann, product manager for Motorola's wireless Internet service. Eventually, users will be able to send and receive faxes by voice.

Ohio Carbon Blank, a manufacturing company in Willoughby, Ohio, is also experimenting with text-

to-speech software. It is using a product developed by Eloquent Technology Inc. in Ithaca, N.Y., to create an online chat room with 3-D graphics that would allow users to listen to rather than read messages from participants. Eloquent's text-to-speech program, Eloquence, incorporates eight distinct predefined voices as well as the ability to create custom voices by selecting gender, pitch, speed, volume and other variables that affect speech. Scott Christley, Carbon Blank's vice president of software development, says Eloquence's flexibility is important because of the different uses of speech synthesis for entertainment and business applications.

Ken Rhie, president of Netphonic Communications Inc. in Mountain View, Calif., says voice synthesis and text-to-speech technology can help bypass some of the

roadblocks to universal information access by becoming the common technology to integrate fax, voice mail, Internet and other communication technologies. With Netphonic's Web-on-Call Browser, which employs text-to-speech technology, users can access and navigate hypertext documents using a telephone. Web-on-Call Browser translates hypertext documents to syn-

thesized speech.

Because some Web features (such as graphics) don't translate well to a phone, users may need time to get used to this new technology, Rhie says.

"People take phones for granted, and people's expectations on the telephone are extremely high," he says. "The Internet is new. People are more forgiving."

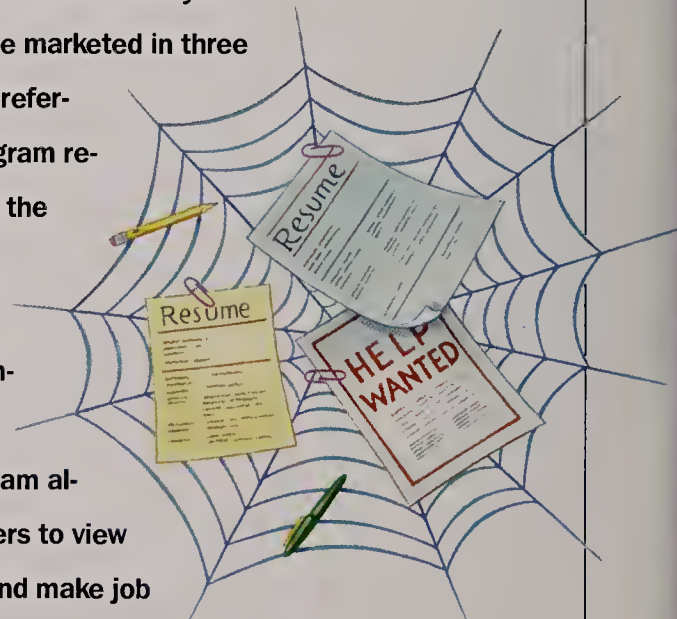
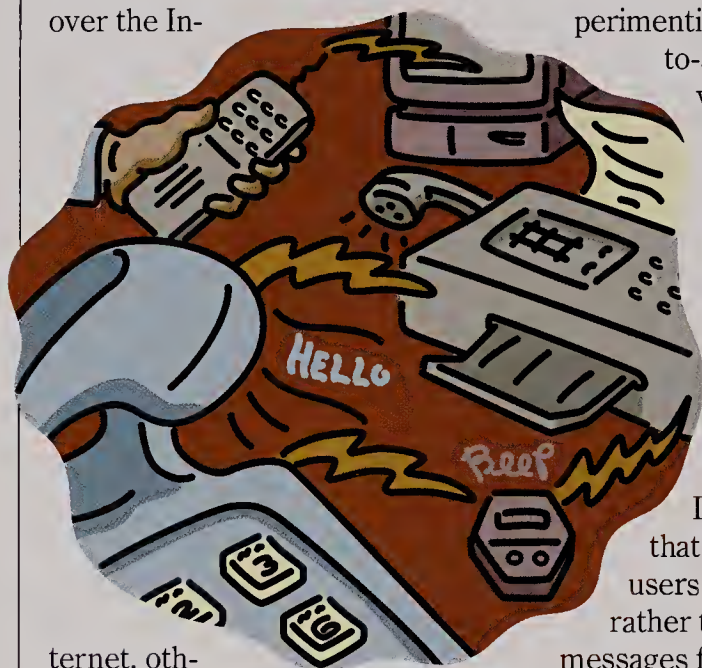
—Heath Row

NET NETWORKING

It's an unfortunate fact that CIOs have historically taken to the Web much slower than to the unemployment line. Rightsizing, downsizing, streamlining, reorganizing and reengineering—not to mention scapegoating—threaten CIO job security and will force 47 percent of IS professionals to work as consultants or temporary hires by 2000.

But now there's relief for CIO job woes, and Yet Another Reason to Get Wired Already. At sites like Information Technology Talent Association (ITTA) (<http://www.it-ta.com>), CIOs can surf their way to a new job. A free lifetime membership in ITTA includes access to job postings, employers, career counseling connections, professional recruiter assistance and surveys.

ITTA members can be marketed in three ways, based on their preference. The Passive program retains the anonymity of the members, allowing them to determine their marketability without risk or commitment. The Active program allows potential employers to view member information and make job offers directly. Finally, ITTA's Pro-Active program places members on a weekly report of available personnel that is sent to participating employers. For more information and ITTA and other services like it, visit http://www.cio.com/CIO/rc_hdhnt.htm.



Think Big. Start Small.



Introducing BayStack.
Because you don't have to be big to need big network technology.

 **BayStack™** Big. Small. No matter what size your network, it has a lot riding on it. So to be certain it can handle the load, build it with BayStack.

BayStack has it all: routing, switching, 10Base-T hubs, 100Base-T hubs and network management—all in one stackable system, all based on open standards. You can put together exactly what you need, using the same technology we build into the world's largest networks.

Plus, you get big-network reliability, with redundant links, Dial Back-up and redundant power. And with Optivity®, you can manage all the components as a single unit—even remote sites. Even with optional RMON.

And get this: it costs less than you'd expect. So call **1-800-8-BAYNET EXT. 33** for a free BayStack video and brochure. Because when you start with BayStack, your network has the potential to really take off.



10Base-T Hub. Up to 10 segments and 260 ports in each managed stack.



100Base-T Hub. Greater bandwidth to servers and high-power workstations.



Ethernet Workgroup Switch. Increased throughput for existing 10Base-T LANs.



Access Node Router. Full protocol support and high availability for remote offices.

TRENDLINES

ONLINE TRADE SHOW

NO JACKET REQUIRED

The Internet is like one of those kids who used to hiss, "I dare ya," into your ear all the time. On one hand, the Internet's challenges are usually pretty interesting; on the other hand, they are—these days, anyway—almost always sucker bets.

François Gossieaux must have jumped off a lot of rocks when he was a kid in Kortrijk, Belgium, because he recently took on the Internet's biggest dare: making the online world compete with reality. Gossieaux's InterAct '96, a "virtual trade show" that ran April 23-25, was billed as the online version of vendor megaconferences, with a 3-D show floor, cyber business card swapping and interactive conferences on such things as online commerce and computer networking—all from the privacy of your own Internet connection. "It's the first trade show you can go to in your PJs," jokes Gossieaux, 35, who was the conference's chief architect and serves as marketing director for Stratus Computer Inc., a software company in Marlboro, Mass. The show was co-sponsored by Stratus, InfoWorld Publishing Co. and *Time* magazine.

Unfortunately, the reality behind the promise was, well, a little too virtual—clunky interfaces, confusing software and deluged servers caused frustration among the estimated 40,000 virtual attendees (as many as two million had been expected) and left Gossieaux

with more than a few marketing bruises. Yet he's satisfied that the idea is far enough ahead of the technology to have merit. ("We're definitely planning an InterAct '97; the question is whether there will be an InterAct '96-B," he says.) Economical booth "space," easy monitoring of attendees' visits, and the absence of plane fares and bar tabs could eventually make online shows a viable alternative. Furthermore, the virtual trade show model puts the purchasing focus where it belongs, Gossieaux says—

less on kicking the tires and knocking back the scotch and more on information. "More and more, we purchase things based on the information about the product rather than the product itself," he says. "This gives people a way to view information easily and then connect to someone to talk one-on-one about it." —Chris Koch



OPENING LINES

Have those pesky HR types been nagging at you to write job descriptions for the openings in your department?

You know, the jobs for which you hardly have time to interview candidates, let alone spare moments to describe the position in excruciating detail. Now there's a resource to provide you with loads of details with minutiae to spare on what responsibilities those jobs

should entail. The *Information Systems Position Description HandiGuide* (Positive Support Review Inc., 1995) lists more than 400 pages of job descriptions, from the lowest schmo on the IS totem to the biggest honcho of the bunch. Each description includes a statement of purpose, challenges of the job, a list of responsibilities and position requirements.

For the CIO title, the book offers this cap to

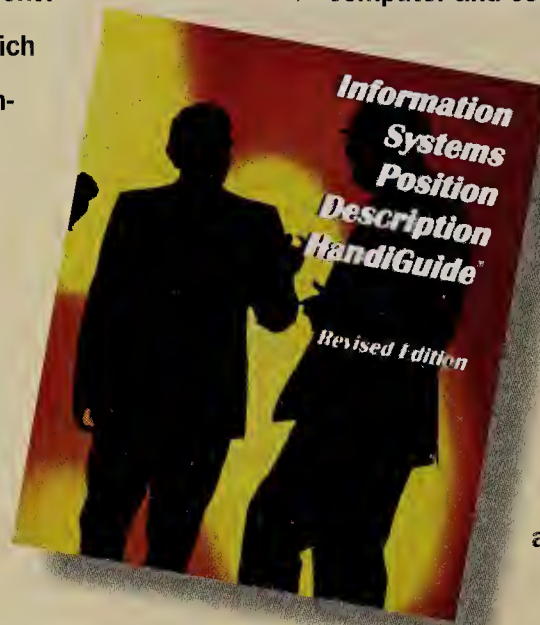
a three-page description: "He or she provides the overall management and definition of all computer and communications activities with-

in the enterprise including responsibility for providing a leadership role in the day-to-day operations of the Information Services function as well as providing direction as the enterprise grows through internal growth and external acquisition."

Piece of cake, right?

The book is priced at \$395.

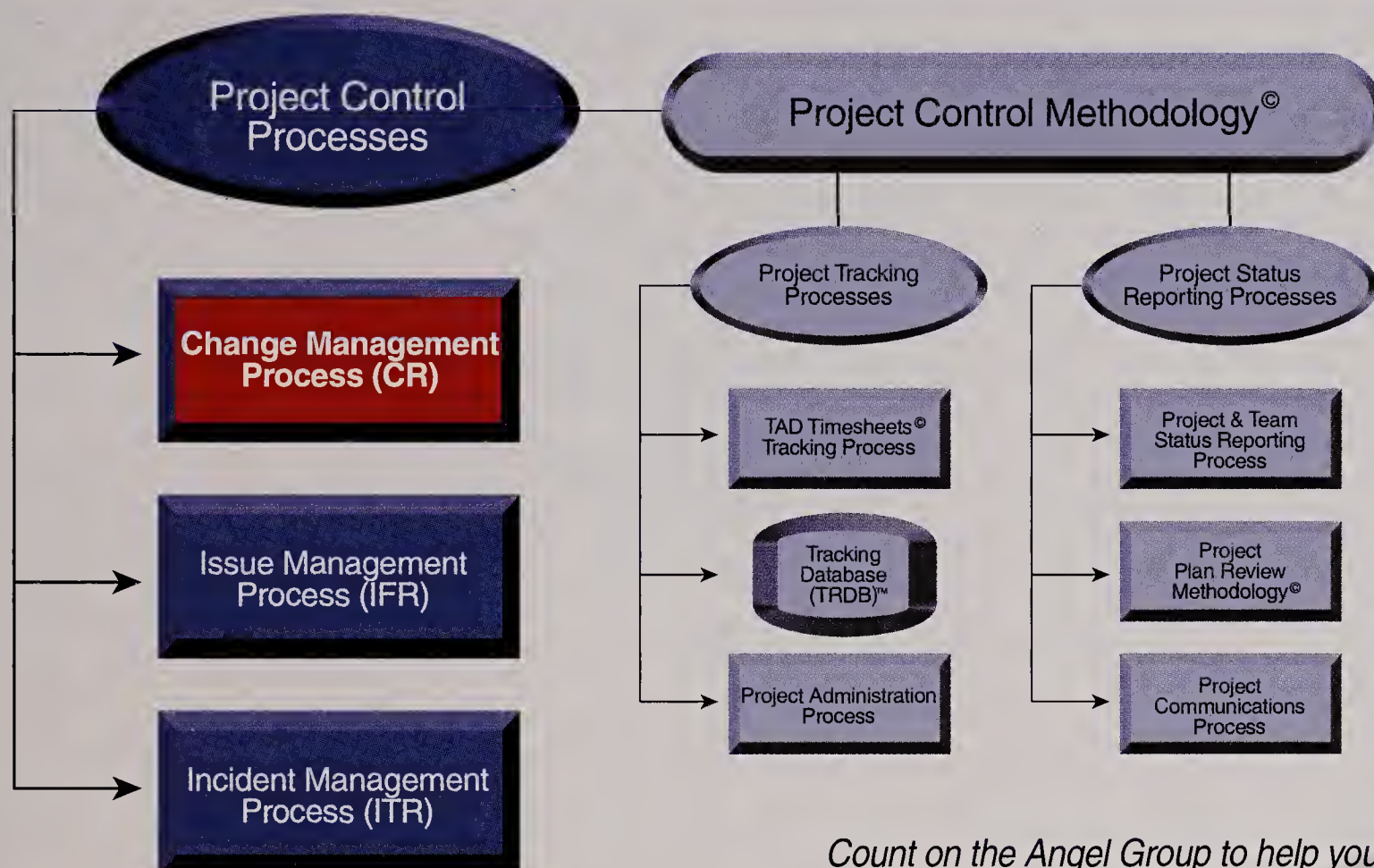
It is also available in electronic form for Windows for \$795 and in CD-ROM format for \$895. For more information call 310 453-6100, e-mail handiguide@psrinc or visit <http://www.psrinc.com/psr.htm>. For more definitions of the CIO role, including CIO's own, visit http://www.cio.com/CIO/rc_main.htm. ■



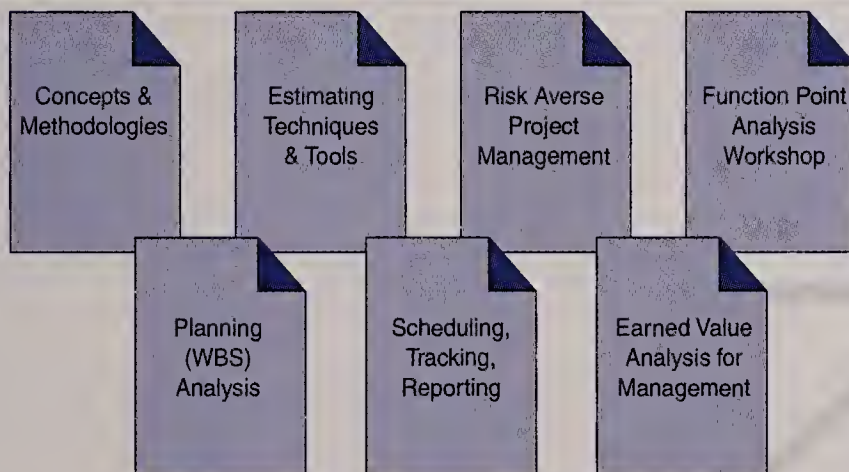
Has your "Helluva" Project turned into the Project from Hell? Call an Angel.

Elegant, No Waste Solutions for Scope Control Problems.

PROJECT DELIVERY METHODOLOGYSM



Project & Risk Management Training Suite



Portions © 1996 SABRE Decision Technologies

Count on the Angel Group to help you disclose, assess and correct project control problems of any size. Using the Project Delivery Methodology ToolsetSM and expert consultants, you get results fast, and effective. Guaranteed.

Amen to that!

Angel Group

We Get It Done!

CompuServe: Go ANGELGRP
 Internet: <http://www.angelgroup.com>
 1-800-705-8801

Built-in multi-point conferencing function easily ties up to four sites together. No costly external equipment, scheduling or technical expertise is required.

On-screen image viewing options include Quartet™ feature (shown), browse and voice-activated full screen.

Full duplex echo cancellor provides clean, articulate audio.

In addition to housing the processor and monitor, the cabinet features a space-saving roll-about design.

High-resolution camera for superior picture quality with six remote controlled pre-set camera positions.



Our remote-controlled 27-inch Super Trinitron® monitor provides high resolution and crisp, clear images. The batteries for the remote are (need we say it?) included.

For ease of operation, pop-up instructional icons can be displayed; AutoHide feature removes icons automatically when not in use.

Utilizes worldwide standards including Integrated Inverse Multiplexer for system flexibility and global connectivity.

Multiple inputs for computer, VCR, graphic and A/V peripherals allow you to collaborate, not just communicate.

IF IT RAN ON BATTERIES, WE WOU

With most videoconferencing systems, getting the features you need means upgrading the basic unit with options.

Which is all well and good. Until you see how much those options cost.

That's not a problem with the Sony TriniCom™ 5000 System. The fact is, most competitors' systems don't include as many standard features. Yet our price point is comparable to other no-frills models.



SONY

LD HAVE INCLUDED THOSE, TOO.

The TriniCom 5000 system isn't our only model, either. We are planning an expanding family of videoconferencing products, so there should be one that fits your needs and budget. And if you ever have a question or

problem, you can expect the same helpful support and service we're known for no matter which model you choose.

To learn more, we suggest calling 1-800-472-7669, ext. 5000. Of course, that's your option.

Trinitron and TriniCom are trademarks of Sony. Features and specifications subject to change without notice. TV picture simulated.

Watch Your Assets

An asset inventory can supply a basis for drafting budgets, implementing upgrades and supporting users better. But executing the inventory is not a trivial process.

BY JOE CASTON

IT asset management is one of the most important maintenance tools in the CIO's kit. As a critical piece of that tool, an IT asset database can provide most of the information required for budgets and forecasts, hardware and software purchases and disposals, and management of software licenses. The same information can also streamline help desk functions.

An IT asset database contains detailed information on all assets in the enterprise—every CPU, monitor, printer, modem, hard drive, software package and network card. With that data, a CIO can determine which computers need more RAM for an upgrade, which end users are running out of disk space (before they call the service desk in a panic) and who is using unsupported software.

The problem is gathering the data.

The baseline inventory of IT assets is the most expensive, most visible and, therefore, most intimidating step required to implement an asset management program. Planning and executing the inventory is not a trivial process—it is an elaborate information-gathering exercise that will require an inventory team to contact every end user and physically visit every piece of hardware in the organization. Further, for the inventory to be successful, it must be accurate, complete and reproducible.

Get It Done Right

Gathering accurate information is not as simple as carefully writing down serial numbers, although recording those is a good first step. (Unfortunately, many PC manufacturers seem to take great delight in hiding their serial numbers in improbable places and printing them in minuscule sizes.) Inventory software helps: Choose collection software that can adapt to your network, that recognizes the particular software your company uses and that is capable of feeding that information into the database you select for asset management. Since no collector software can physically capture labels or tags, you must manually gather all that information. Before conducting any inventory, establish a collection process and test it. Examine how it meshes with the collector software. To be sure you have it right, use a broad sample—at least 50 machines—of end-user systems.

Make preliminary choices about the data to be recorded and establish naming conventions. Will you record the manufacturer's model number on the back of a monitor, BZ-1447-Q, or the product name on the front, SuperDuper VGA? Is the best description of the item's location really "Just



Anyone Can Put Terabytes In A Box.



The Trick Is Getting Them Out.

Today, your mainframe and open systems users demand more than massive storage capacity. They demand massive access — non-stop, fail-safe and lightning-fast. No small trick. Fortunately, Amdahl makes storage systems to satisfy the most demanding mindsets.

Your open systems users won't mind having unprecedented data access. That's what our new LVS 4000 client/server storage family delivers. Performance that scales up with capacity — to a stunning 20,000 I/Os per second at a full terabyte.

Our Spectris™ storage family puts System/390 users' minds at ease with non-stop data delivery. Through batch and on-line processing, even maintenance. 24 x 365, non-stop performance.

Satisfying demanding users is no trick at all. Just go with Amdahl.

(800) 223-2215. <http://www.amdahl.com>.

amdahl

©1996 Amdahl Corporation. Amdahl is a registered trademark and Spectris is a trademark of Amdahl Corporation. All other trademarks are property of their respective owners.

outside Bernie's office," or are grid coordinates on a standardized floor map preferable? Train your inventory teams to ensure accuracy by taking time to double-check their notes.

Once you are ready to begin in earnest, send surveys to all the employees who use computer equipment. Ask for basic identification information (name, department, phone number) and the specific location of the hardware they use (building, floor, office number). When the inventory team visits each desktop, team members should collect forms and scan for accuracy. Care at this stage will minimize future follow-ups. Other information worth gathering at this time includes the end user's cost center and job title, and the computer's network address and serial number. Be sure to record manufacturer names and model names or numbers.

Create a large team to complete the inventory in a timely fashion. Two well-trained people working without interruption can inventory as many as 30 computer systems in a day—but only half that number if the inventory is conducted during the business day. So an inventory of 900 computers can take between 60 and 120 worker-days.

Do a Thorough Job

Once you have determined what information you need, use detailed maps of the areas to be inventoried so you can locate all your hardware. To gain access to each item, coordinate with end user management to enter secure areas, ensure that all "power on" or screen saver passwords are disabled, and schedule dates and times for inventory teams to have access to laptops. Early, clear and complete communication with managers and end users is crucial at this stage.

Aside from its cumbersome scale, the inventory process itself is relatively straightforward. When an inventory team arrives at a desktop,

they have three jobs:

- Record the required data about hardware either on paper or by entry into the inventory collector at the desktop

- Scan for viruses to ensure that the inventory exercise won't create more problems than it solves by spreading nasty bugs from machine to machine

- Use an inventory software collector to identify hardware components and all executables on the hard drives

(There is a fourth option that's not strictly an inventory exercise: As

No matter how well you plan the process, don't expect to inventory every computer the first time you visit it—some will have viruses that can't be removed, others will have hardware problems, and still others will be locked away in an office or by password. Some may simply be missing.

long as swarms of people are buzzing about all the computers in your organization, take the opportunity to install virus scanners, defragment hard drives or install software upgrades.)

Expect to find unidentified software during the inventory. Most inventory collectors can be customized to recognize unique or uncommon software by file name, extension, size and date/time stamp, but there still will be plenty of freeware, shareware or other unauthorized (and possibly pirated) software on end-user hard drives. Deviations must be investigated; have a plan for replacing nonstandard software with the organization's current software suite, licensing errant programs where required or removing them.

No matter how well you plan the process, don't expect to inventory every computer the first time you visit it—some will have viruses that can't be removed, others will have

hardware problems, and still others will be locked away in an office or by password. Some may simply be missing. So budget time and money for follow-up visits to end-user offices and develop alternative methods for taking inventory of computers situated at employee homes or of laptops traveling with executives.

A Renewable Resource

To be of continuing value to the organization, the asset database that results from a baseline inventory must be verifiable by anyone concerned with the accuracy of the data, such as an organization's technical support group, their internal audit department or the Software Publishers Association.

Subsequent users of the newly created inventory database must be able to locate any computer in the organization, confirm its identity, and identify the peripherals and software—an easy task the first post-inventory day but one that's a bit more difficult six months or a year later. Try to have one easy and sure

way to identify each machine. Tags on the front of the monitor are arguably the most useful; imagine your service desk personnel asking the CEO to turn his machine upside down and look for the serial number.

Merely gathering correct information once won't ensure that a database remains accurate, though. You have to track assets every time they move and capture every hardware or software change. Periodically run collector software over the network and incorporate changes reported by IT personnel who install or move computers, update software, add or replace hardware and connect end users to your network.

Vigilance pays. An accurate inventory is a valuable tool that in the end will make everyone's job easier. 

Joe Caston is the CEO of Infolink Corp. He can be reached at 303 773-8151 or jcaston@Infolink-audit.com.



He's 29.
Has 3 degrees.

Lives on caffeine and
jelly rolls.

Works for your
competitor.

And right now he's
downloading your inventory
projections.

You don't know him. But he might know you. The fact is, hackers are virtually everywhere. And if your network isn't protected by a BorderWare firewall, it's not as secure as it should be.

BorderWare is the first firewall designed to be as smart about time and money as it is about security. It's the only firewall that's up and running in hours, not days.

It offers total transparency to all authorized users, so existing software and procedures don't need to be modified, and no one needs retraining. It runs its own diagnostics.

What's more, it doesn't require expensive workstations. In fact, BorderWare operates on an Intel® processor.

As well, it has everything you need to link to the Internet: Mail, News, WWW, FTP and DNS. And it combines packet filtering with both application-level and circuit-level gateways.

BorderWare also enables you to define proxies for secure and specialized applications through the firewall. It responds to attacks and initiates alarms. And is configured to grow as you and your enterprise do.

It's an impressive list of features. But it has to be. Because the whole world, unfortunately, is watching.

<http://www.borderware.com>

BORDERWARE™

Nobody Comes Close

All trademarks are the property of their respective owners.

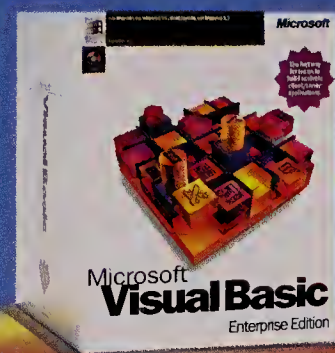
Call us at 1-800-334-8195 or +1(416) 368-7157. Fax +1(416) 368-7789. 20 Toronto Street, Suite 400, Toronto, Ontario, Canada M5C 2B8.

If you're going to **bury**



Getting Unburied

Microsoft Enterprise Development Partner Tools
First in a Series



Microsoft

WHERE DO YOU WANT TO GO TODAY?™





SELECT Enterprise™ is an established modeling tool-set for building scaleable multi-tier client/server applications in Visual Basic and Visual C++.® SELECT Enterprise closes the traceability loop by integrating business process models with use cases and object models, providing round-trip engineering of Visual Basic code using OLE automation, and facilitating the automatic deployment and redeployment of business objects across the enterprise. Visit <http://www.select-software.com>.



Team **Attachmate's** Enterprise Client/Server Series together with Visual Basic and expand the scope of client/server applications to include host screens, databases, or logic. No communications expertise required! Choose QuickApp to automatically integrate host screen-based data, QuickDB to access host databases, and QuickPeer to incorporate host business logic. Visit <http://www.attachmate.com>.

C E N T E R V I E W

Choreo 2.0 is an integrated client/server development extension for Microsoft Visual Basic 4.0 that enables developers of any level of experience to quickly and visually create high-performance, multi-user applications for the Windows NT™ and Windows® 95 operating systems. Choreo enhances Visual Basic with a model-driven data access engine that manages all database interactions between client and server. Visit <http://www.centerview.com>.



Use **Report Experts** to quickly design reports and analyze data. Seamlessly integrate reports into Windows applications using the Report Engine DLL with direct calls or the powerful OLE Control (OCX), VBX, MFC, or VCL interface. Version 4.5 includes both 32- and 16-bit components. PC, SQL stored procedure, and ODBC database support. Free runtime. For more information visit <http://www.seagate.com/software/crystal>.



Application Generator
(formally DECADEMIRE) extends the easy-to-use features of Visual Basic to large-scale applications. Developers in workgroups can now define, prototype, test, and deploy high-volume, enterprise wide two-tier and three-tier client/server solutions for business-critical needs. For ordering information contact your Digital Business Partner Representative or Digital at (800) DIGITAL or visit <http://www.digital.com/info/decadmire>.



Stop risk in its tracks when deploying mission-critical applications, with Automated Software Quality tools from **Mercury Interactive**. Tools include TestDirector, WinRunner, LoadRunner, and TestSuite. No other product suite tests, benchmarks, and tunes GUI clients, middleware, and servers better than these. For more information call (800) TEST-911, or visit <http://www.merc-int.com>.



*The Model
Management Company™*

Using **ERwin®/ERX** for Visual Basic, developers will fly through client/server development! This award-winning database design tool generates SQL or Access databases or reverse-engineers any existing database into a data model. ERwin's Form Wizard creates a ready-to-run Visual Basic form directly from the database design. Learn more at <http://www.logicworks.com/vbfact.htm>.



Use **Parity Software's** CallSuite family of OLE controls to build computer telephony (CT) functionality into Visual Basic applications. Add fax, voice mail, and other CT features easily using VoiceBocx (voice), FaxBocx (fax), ChatterBocx (text-to-speech), and MatchBocx (voice recognition). Call Parity Software at (415) 332-5656, * and one of our expert telephony engineers will help get your project started today. Visit <http://www.paritysw.com>.



Microsoft Visual Basic

The RAD tool for the enterprise.

<http://www.microsoft.com/devonly/>

There's no doubt that developers have their work cut out for them. They need RAD tools for robust solutions. Tools like Visual Basic® Enterprise Edition, combined with tools from Microsoft® Enterprise Development Partners.

Using these tools developers can now optimize Visual Basic for their specific programming needs. Each tool is tightly integrated with Visual Basic through OLE. And since Visual Basic is the leading tool for client/server development, more developers can share and leverage the existing code base, increasing reuse.

RATIONAL

SOFTWARE CORPORATION

Rational Rose/Visual Basic supports object modeling and controlled iterative development for teams of Visual Basic 4.0 developers building three-tiered enterprise applications. It supports the Booch and OMT object-oriented analysis and design methods and provides code generation and reverse engineering for Visual Basic 4.0. For more information please see <http://www.rational.com>.



Rockwell Software's RSToolbox OLE controls extend Visual Basic's enterprise capabilities into the manufacturing arena by providing a graphical operator interface on the plant floor as well as a vehicle to move valuable production data to central systems such as accounting, manufacturing execution, and IS. RSTools are specialty OLE graphical custom controls. RSPowerTools are "behind the scenes" custom controls. Call **(414) 321-8000** for more information.



Sterling Software's KEY: Workgroup brings a unique workflow-based approach to development that makes it easy to capture business processes and quickly turns them into applications. KEY: Workgroup integrates workflow modeling, BPR, data analysis, and visual development in an environment designed to reuse objects and components for the development of robust, scaleable client/server applications. Call (800) 338-4130 or visit <http://www.key.sterling.com>.

Microsoft

Visual Tools

Community

Latest Technology

Integration

Teamwork

Components

Enterprise

your developers,
at least give them an **out.**

WITH TOOLS FROM OUR ENTERPRISE PARTNERS,
VISUAL BASIC HELPS DEVELOPERS CREATE ROBUST,
ENTERPRISE SOLUTIONS FASTER THAN EVER BEFORE.

Why is it that the people who come to you with big plans have no idea how long it takes to implement them? IS professionals like you are more realistic. You know that robust enterprise solutions take time. But you still need to meet your deadlines *and* keep developers sane.

Now you can, thanks to the Microsoft® Visual Basic® 4.0 Enterprise Edition development system – the first completely RAD tool for distributed client/server development. Remote Automation Technology lets developers dynamically deploy partitioned applications across networks. Which reduces maintenance, increases code reuse, and helps developers deliver more robust enterprise applications in less time.

And, since Visual Basic is an open development system, supported by Microsoft Enterprise Development Partners, your developers will have plenty of options. Like tools for data, object, and process modeling, as well as application testing, maintenance, and bug tracking. Tools that are tightly integrated with the same familiar language used by more than three million developers



The RAD tool for the enterprise.
<http://www.microsoft.com/devonly/>

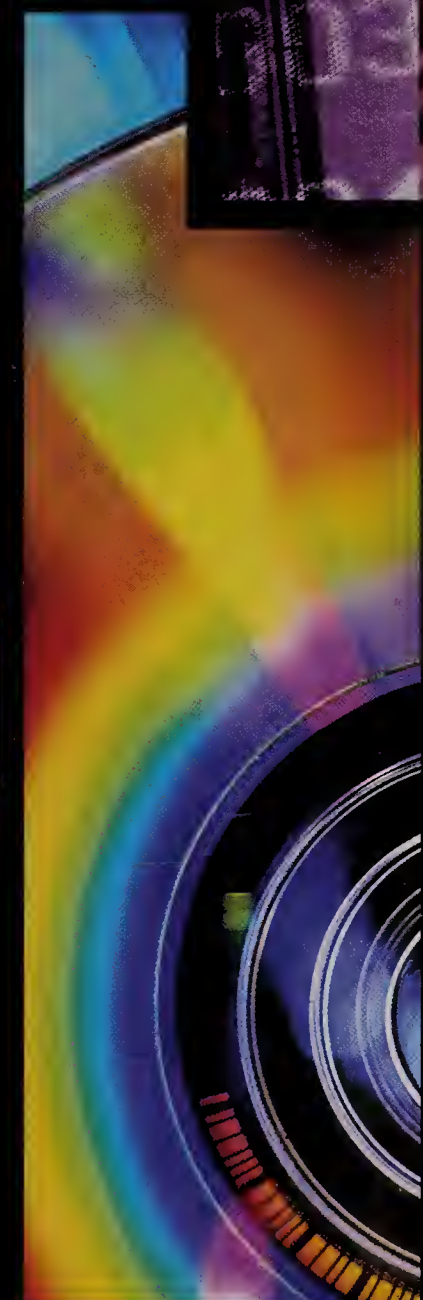
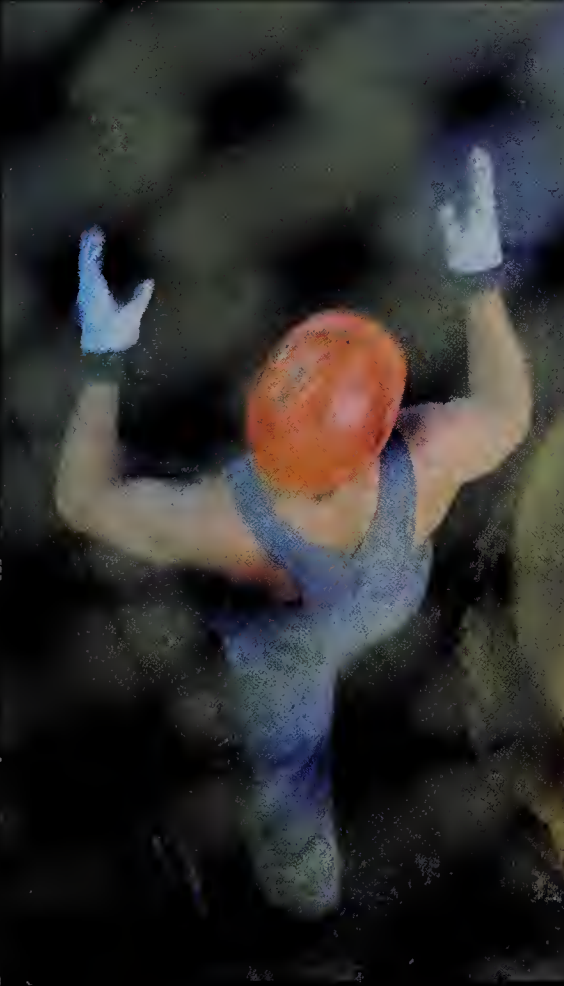
worldwide. Not some proprietary language known only to a select few.

Still, you might be skeptical. Good IS professionals usually are. So give our DevOnly Web site a whirl at <http://www.microsoft.com/devonly/>. Or call us today at (800) 228-6139*, Dept. A416, in the fifty United States for more information. Your developers may not need a rescue. But with Visual Basic, and the tools you'll find in this brochure, they'll get a leg up on development.

© 1996 Microsoft Corporation. All rights reserved. Microsoft, Visual Basic, Visual C++, and Windows are registered trademarks and *Where do you want to go today?* and Windows NT are trademarks of Microsoft Corporation. All other trademarks and trade names are the property of their respective owners. *Offer good through August 31, 1996. In Canada call (800) 563-9048; outside the U.S. contact your local subsidiary.

Microsoft®

WHERE DO YOU WANT TO GO TODAY?™





THE TOLL OF A New Machine

SPECIAL FOCUS ON SAP

CIOs worry that installing SAP software will blow their budgets—and their careers—to smithereens. But does the problem lie in the software? Or are CIOs caught up in a tangle of multinational business processes that threaten their companies' plans to implement SAP? *CIO* looks at the ups and downs of enterprise resource planning software:

- **Ready or Not, page 36**
- **Flipping the Switch, page 43**
- **Profiles of SAP Players**
- **Interactive Article Forum**
<http://www.cio.com/forums/SAP.html>

BY E.B. BAATZ and CHRISTOPHER KOCH



Ready or Not

Client/Server software from SAP AG is sweeping the enterprise. Here's why CEOs are buying—and how CIOs are coping.

BILL KREDEL, the CIO at Autodesk Inc., is ecstatic. His investment in the software phenomenon called SAP has paid for itself twice over in the first six months in reduced inventory alone. And at Pacific Gas and Electric Co., a planned \$35 million SAP R/3 project ballooned to \$70 million, but Senior Vice President and CFO Gordon R. Smith is nonetheless satisfied with the outcome so far. On the other hand, one chemical company's attempt to install SAP's mainframe R/2 software for a mind-boggling \$200 million was, says one source, an "absolute bloody disaster."

Welcome to the wild and woolly world of packaged enterprise resource planning (ERP) software, where either sweet success or glorious failure await and where, as a result, market dominator SAP AG is being both deified and denounced.

The software, it seems, does work. But the enthusiasm for SAP

sours in some cases because *implementing* the software requires people and processes to follow the ERP mandate to integrate all of the major business functions—no easy, nor inexpensive, task.

Founded in 1972 by several ex-IBMers in Walldorf, Germany, SAP AG has stormed the manufacturing market, first conquering Europe with its R/2 mainframe software and then winning North America in the '90s with its R/3 client/server product.

Demand has exploded from process manufacturers, automakers and high-tech companies, and SAP AG and its subsidiary SAP America Inc. are now planning campaigns to win the financial services, health care, utility and nonprofit industries. "More than a product, SAP has created a movement. It's the closest thing to a de-

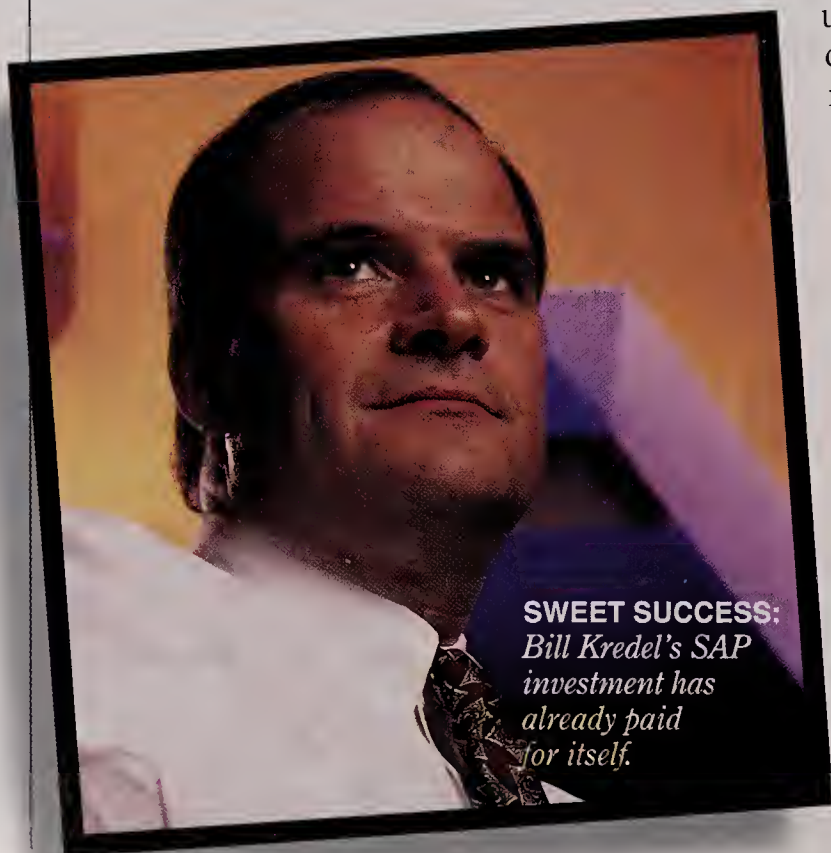
facto standard since the glory days of Big Blue," says Marcus Harwood, a partner and worldwide director of Ernst & Young LLP's SAP Implementation Services in Atlanta. In short, the SAP movement is overhauling the corporate IT landscape like a bulldozer in overdrive.

What's the allure of SAP? "It appears to be fast and flexible, with the ability to change your business and deliver information when and where you need it—in other words, it's the holy grail of IT," says James A. Jones, managing director of The Information Management Forum, an IS executive peer organization in Atlanta. "If SAP delivers, then it is delivering what IT has been promising for a couple of decades," he adds.

That dream—particularly for CFOs who struggle to quickly balance the books of global divisions—would enable businesses to operate in a totally integrated fashion. SAP's off-the-shelf software modules control finance, manufacturing, distribution and human resources. The streamlined processes of those functional areas are connected by one software package rather than multiple packages kludged together by complex interfaces written and maintained by the IS staff. Users enter business data into the system once, and payroll, factory materials allocation, inventory, shipping, customer service and accounts receivable all follow in sync.

Multinational companies have bought into SAP in a big way, in part because SAP is available in dozens of languages, with each country's version tailored to local currencies, tax laws and accounting procedures. "If we're short of inventory in Singapore, we now can ship product from the United States, and we won't lose the order," says Autodesk's Kredel. Furthermore, 98 percent of the San Rafael, Calif., software company's orders from the United States and Asia are shipped within 24 hours, a far cry from the two weeks that used to lapse between order and shipment.

Customers like Kredel also point to the fact that R/3 has been a driver



SWEET SUCCESS:
Bill Kredel's SAP investment has already paid for itself.

How To Turn Decision Support Into A Decided Advantage For Your Enterprise.

Introducing Commander Decision™. Better, Faster, and Easier-To-Implement Decision Support Applications.

Throughout your enterprise, managers are asking you for more data and more analytical power so they can do their jobs better. Unfortunately, there are more of them than there are of you. So how do you provide your users with more effective decision support applications today, without adding years to your backlog?

The answer is decidedly simple: Commander Decision.

Give The People What They Want.

Commander Decision puts DSS applications in your users' hands, not in your lap.

Across the enterprise, users can create their own powerful applications so they can easily review business information and make informed business choices without having to rely on your IT department's staff.



Decision speeds delivery of DSS applications like customer and product line profitability, enterprise budgeting, sales and marketing analysis, and key performance indicator and critical success factor reporting.

Work Smarter, Not Harder.

Commander Decision gives both IT specialists and end-users powerful productivity advantages that other decision support solutions can't match. In a single package, it offers specialized data integration capabilities that can read data from almost any source, cleanse it, and shape it efficiently for business analysis. And its maintenance-free design features ensure that once your application is up and running, it will stay that way, no matter how often your data structures change.

Good for Your Environment.

Open, client/server Commander Decision extends the power of OLAP through its

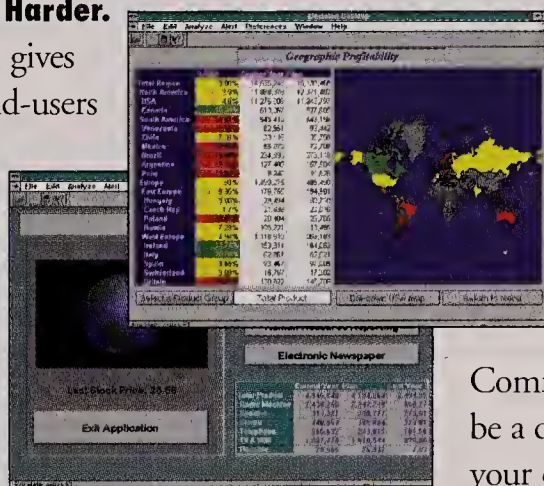
seamless integration with Arbor Software's multidimensional Essbase™ engine, and it fits easily into your Microsoft® environment.

The Bottom Line.

New Commander Decision draws on Comshare's 30+ years' experience as the market leader in decision support

software. Three thousand leading corporations worldwide count on DSS and EIS applications from Comshare. Call now to see how

Commander Decision can be a decided advantage to your company.



Call 1-800-922-7979 for Comshare's new white paper, "Commander Decision: Making a Success of the Data Warehouse."

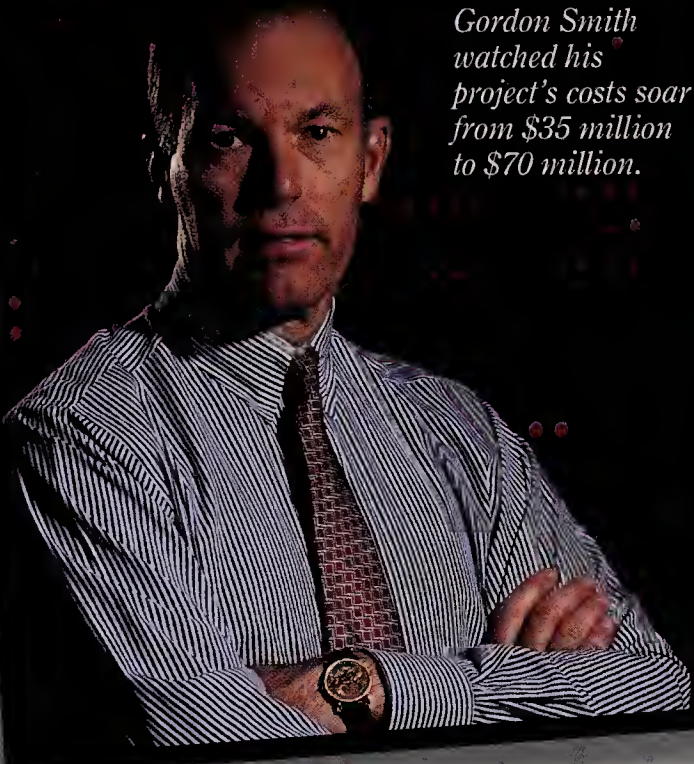
COMSHARE

THE DECISION SUPPORT COMPANY™

<http://www.comshare.com>

DOUBLE VISION:

Gordon Smith watched his project's costs soar from \$35 million to \$70 million.



to shed aging mainframes and move on to modern distributed computers. For a couple of years, in fact, SAP was the only ERP vendor selling a spiffy graphical user interface (GUI) on a client/server platform. "The SAP competitors are only now shipping product with a GUI," says Bruce Richardson, vice president of research at Advanced Manufacturing Research (AMR) in Boston. "SAP was able to come in and show a 20-minute 'drive-by' with a beautiful front end; it just blew away the green-screen competition."

Indeed, with 1,500 live installations of SAP R/3, SAP has blanketed the globe in a very short time period. SAP AG earned \$1.89 billion in revenues worldwide in 1995, with a whopping \$1.15 billion of that coming from sales of R/3. In client/server application sales, SAP dwarfs its two closest rivals: Oracle Corp. at \$300 million and PeopleSoft Inc. at \$210 million, according to estimates from Framingham, Mass.-based International Data Corp., which has the same parent company as *CIO*.

But getting an SAP effort to yield fruit hasn't been easy for customers, say observers, mostly because many companies install the software for the

wrong reasons. "Ostensibly, people use SAP because it is totally integrated," says Peter W.C. Mather, vice president of MIS at Air Products and Chemicals Inc. in Allentown, Pa. "But the real reason that many companies are implementing SAP is because management is trying to bring discipline into the organization. They're using SAP to enforce the reengineering process. IS people, in many cases, have had SAP jammed down their throats."

James Moffatt, a partner with Coopers & Lybrand LLP in Philadel-

**Any CEOs who think
once-autonomous business units
will run as a well-oiled
hierarchical machine
under SAP
had better think twice.**

phia who has been studying enterprisewide systems such as SAP against the best-of-breed, hodgepodge-of-systems approach, agrees with Mather's analysis. "Mandating SAP from the top down is a terrible mistake," says Moffatt. "You need the buy-in of all the employees in order to make the changes in people's jobs that the software will impose."

For starters, any CEOs who think they are going to make once-autonomous business units run as a well-oiled hierarchical machine under SAP had better think twice. A rapidly changing, decentralized company, for example, should not implement R/3, says Russ Maney, a research director with Forrester Research Inc. in Cambridge, Mass. "SAP will be nothing but a headache for them," he says. "And a decentralized

company that thinks SAP matches its business model will make a fatal mistake by trying to implement it."

Others, including Mather's Air Products and Chemicals, have opted not to deploy SAP software because the IS department's systems are already fairly well integrated. "We don't have 10 general ledger systems and five procurement systems worldwide," says Mather. "Through the years, we've been rigorous about looking for synergy [between software packages]."

If information systems have been neglected to the point of disrepair, Mather adds, then perhaps a suite of integrated ERP software would make sense. For many companies whose IS people feel like beleaguered soldiers doing battle with legacy monsters, SAP enters like a white knight (see "Marketing Genius," Page 62).

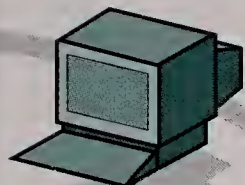
At Autodesk, for example, the company's 40 products had 20,000 order codes before turning to SAP; after SAP, the number of codes was pared down to just 1,600. And the system will not only provide the CFO with the financial data he needs, but with R/3, the company will be installing a client/server network to get back on track with the technology leaders.

Furthermore political bickering—about how one division or another will define materials codes, customer accounts and product lines—takes a back seat to the iron rule of SAP software. Of course, "the downside of SAP and using common data is that you end up with the lowest common denominator," says Thomas H. Davenport, director of the information management program at the University of Texas at Austin and a regular columnist for *CIO*. For example, companies have a lot of different types of customers; by imposing just one definition of "a customer" on all, some groups within the company may find that the data from the system doesn't meet their needs, says Davenport.

Yet even if a company installs SAP software for the so-called "right" reasons and everyone can agree on the



Perhaps you don't care who invented laser printing, particularly when you've got more important things on your mind. Like reengineering critical applications as you transition to client/



server systems.

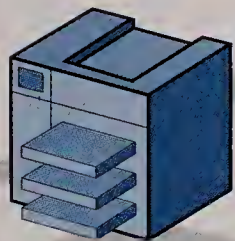
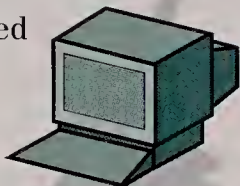
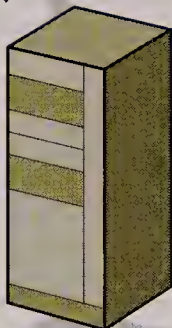
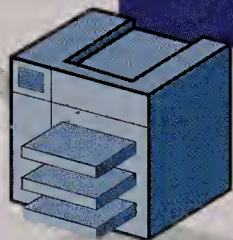
Like putting together

the pieces

to achieve a robust open systems environment. Like getting through the rest of the week!

Ultimate Output

One of the most frequently overlooked parts of client/server environments are the output devices. Which means printers. Printers capable of using sophisticated graphics, variable fonts, and impactful color to create



quality documents that impress customers.

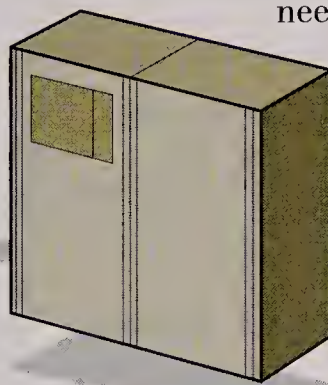
Which brings us back to us. Because no one has more years of laser printer experience and expertise, or more printing systems capable of doing justice to single

WHO INVENTED THE LASER PRINTER?

or mixed platform client/server environments. And no one has more understanding of how document production can enhance all the goals of your enterprise.

More of Everything

Whatever applications you run, whatever platform you run them on, our print systems can dramatically improve document output. With unmatched hardware connectivity and multiple data stream compatibility, they meet accepted industry standards, and their advanced paper



virtually any network.

More peace of mind

So if you're starting to consider print as part of your client/server reengineering, think about the people

who invented laser printing, because we've got systems that can make the most of all your efforts. For more information on Xerox

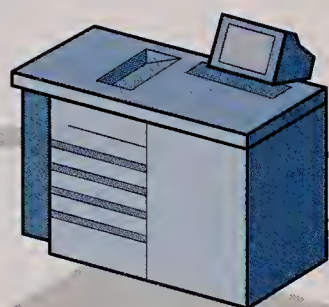
Laser

Printing Systems,

talk to your

Xerox Marketing

Affiliate, or for



an informative white paper on midrange printing systems, call

1-800-ASK-XEROX, ext. 394.

THE SAME PEOPLE WHO MAKE MORE PRINTERS FOR CLIENT/SERVER ENVIRONMENTS.

THE
DOCUMENT
COMPANY
XEROX

XEROX® The Document Company® and the stylized X are trademarks of XEROX CORPORATION. Contact Xerox for details on the Total Satisfaction Guarantee. 36 USC 580.

handling capabilities make them perfect for any environment. And

as our Open

Print System

solutions can

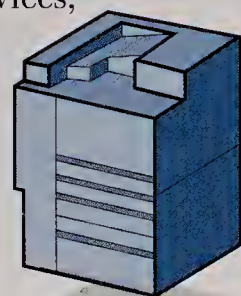
incorporate a range of

software services,

our printers

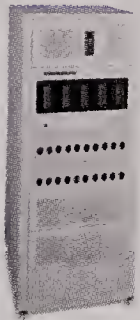
are easy to

manage on



THE
DOCUMENT
COMPANY
XEROX
Worldwide Sponsor

FOR EVERYONE WHO'S BEEN WAITING PATIENTLY FOR FASTER NETWORK STORAGE.



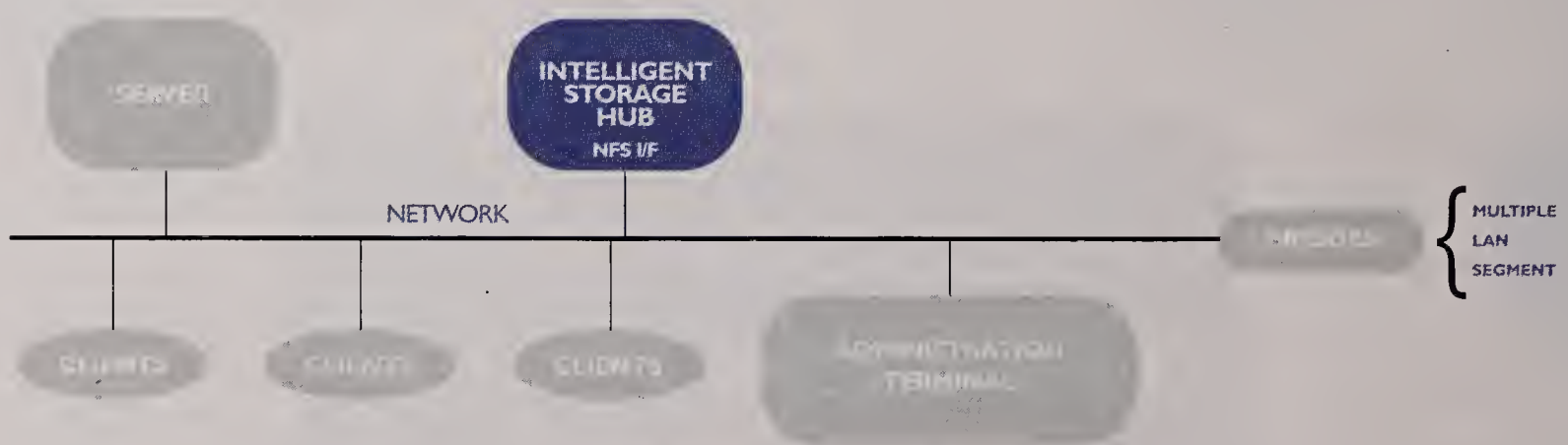
HOW DOES 50% FASTER SOUND? Probably like a dream, at least to system administrators desperate for a smarter way to manage data. In that case, the Symbios Logic MetaStor SH4000 intelligent storage hub is a dream come true. It's a new storage system that attaches directly to your network and significantly increases throughput. Better still, it's from Symbios Logic, a leader in storage technology.

The solution to managing data across large networks isn't as simple as adding disks, or even buying a new server. Because general-purpose file servers are not optimized for centralized network storage. Our intelligent storage hub is. While storing up to 252 GB, it enables you to support more users and reduce response time. It eliminates bottlenecks, automatically backs up and restores, conserves network resources and controls costs.

How is all this possible? Simple. Everything about the MetaStor SH4000 intelligent storage hub is dedicated solely to worry-free storage. There's no excess code, no traditional speed bumps like virtual memory or application interfaces.

METASTOR™ It's all about I/Os and an astounding NFS Ops of 1,350. Again, up to 50% faster than general-purpose file servers. But the dream gets even better. Better because our intelligent storage hub also includes high-bandwidth RAID and industry-leading 99.99% data availability. Better because it's designed for easy expansion. And better because its integrated five-DLT-drive tape array means up to 400% faster backup.

The demand for centralized storage with blazing I/Os has never been greater. And the solution has never been clearer. Or more affordable. The MetaStor SH4000 intelligent storage hub, relief for the storage-hungry masses. To learn more, call Symbios Logic at 1-800-86-ARRAY, or visit our Web site at <http://www.symbios.com>.



The MetaStor intelligent storage hub attaches directly to your network, increasing data throughput by up to 50 percent.

☐ **Yes**, I've waited long enough for a better network storage solution.
I'd like to increase my network storage performance by 50 percent.
Please send me more information about Symbios Logic and the
MetaStor Intelligent Storage Hub.

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Phone _____

Fax _____

E-Mail _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

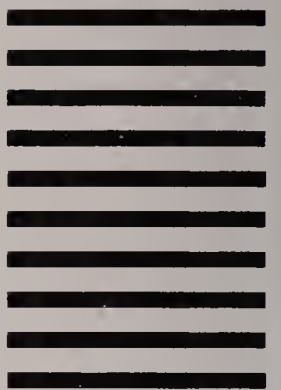
BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 804 COLORADO SPRINGS, CO

POSTAGE WILL BE PAID BY ADDRESSEE



SYMBIOS LOGIC
1036 ELKTON DR.
COLORADO SPRINGS CO 80907-9813





SYMBIOS
LOGIC™
The Storage Connection

The Champ

WHEN BILL KREDEL was hired as the CIO for Autodesk in 1993, he was 44 years old and eager to help his new company make IT work better. "No one believed we could move from our old systems to SAP in just six



Bill Kredel
vice president and
CIO, Autodesk Inc.,
San Rafael, Calif.

months," he says. They did, though it wasn't easy. "I lost a lot of hair and had two root canals during the summer of 1993 [in the pilot phase of SAP]," says Kredel. "My dentist told me that I was grinding my teeth so hard at night that they cracked." Every time the rapid project appeared to slow down, Kredel would gather his SAP team for a pep (or exhortation) talk. When the consultants said some part of the project just couldn't be done in time, Kredel would hand out copies of his favorite book, *The Little Engine That Could*.

"It helped that I had total executive commitment for this project," says Kredel. "Management's bonuses were partly dependent on whether we were successful with our Systems 2000 project," he recalls. "I knew we had made good when the head of a division came in to look at the executive information system and said, 'Is this data for real?' When I said, 'Yes, it's absolutely accurate,' his reaction was, 'When do I get this system for Europe and Asia?'"

optimal definition of a customer, the inherent difficulties of implementing something as complex as R/3 is like, well, teaching an elephant to do the hootchy-kootchy.

"From the focus group meetings that we have held, it is apparent that one of the major challenges of our members has been to accurately estimate and communicate the complexity involved," says Chuck Lybrook, executive director of The Information Management Forum. And SAP software is complex, reflecting the complicated and sometimes dysfunctional business processes that run big companies.

The software has a remarkable number of tables—8,000—that IS programmers and end users must set to match their business processes; each table has a decision "switch" that leads the software down one decision path or another. By imposing only one way for the company to do each task—say, run the payroll or close the books—a company's operating units and far-flung divisions are integrated under one system.

But figuring out precisely how to set all the switches in the tables requires a deep understanding of the existing processes being used to operate the business. As the table settings are decided, business processes are reengineered, à la SAP.

"The problem is you have CIOs running multimillion-dollar projects, often with very little project management experience," says Jeremy Coote, president of SAP America Inc. in Philadelphia. "The CIO shouldn't be left holding the bag. More than anything before it, the SAP revolution has gotten the business community to take responsibility for the business process." Until SAP came along, for example, companies were not able to take the entire order-to-cash cycle on a single computer platform, says Coote.

Also, it's important to understand that most other ERP systems are not shipped as a shell system in which customers must determine at the minutia level how all the functional procedures should be set, making

thousands of decisions that affect how their system behaves in line with their own business activities. "Most ERP systems are preconfig-

“CIOs want to complete projects in six months or less because they know how fast the business is changing.”

—Bruce Richardson

ured, allowing just hundreds of procedural settings to be made by the customer," says industry analyst Alice H. Greene of Industry Directions Inc. in Newburyport, Mass. "To some, the flexibility of SAP is worth the headache. To others, it's not."

Realistically, it can take two to three years to implement SAP R/3 at a large multinational company. Outside consultant fees can cost \$1,500 a day, and—with a waiting list for R/3 training that is several months long—expenses can swell in the process. Holding on to SAP-trained IS employees, whose salary potential suddenly doubles or triples in the labor market, makes CIOs cringe as well.

"We're seeing a real strong sense of impatience in the market," says AMR's Richardson. "CIOs want to complete projects in six months or less because they know how fast the business is changing. And the competition is exploiting that now." For example, says Richardson, Baan Co. and Oracle tout the fact that the ratio of software licensing costs to consulting services costs runs 1-to-2 for their products, while SAP's ratio runs 1-to-5 and sometimes as high as 1-to-10.

To ease the installation pain, SAP AG is now shipping software with embedded configuration tools that speed the decision processes. "It takes time to internalize the information flow," Coote admits. "But the software works."

True enough. But will it work for your enterprise? And, if so, at what cost?

Senior Editor E.B. Baatz can be reached at ebaatz@cio.com.

Flipping the Switch

What's the best way to restructure your organization's processes? Three companies take different approaches to implementing SAP.

THE ORDEAL OF INSTALLING SAP AG's R/3 software does something underhandedly wonderful to IS and business people: It forces them to change the way they work together. R/3 breaks the mold of the traditional systems project, in which IS takes the lead and programming rules the day. And it places the burdens of implementation where they belong—on the business, which must develop a new way of working, and on IS, which has to make it happen.

"You have to treat SAP as a business, rather than an IT project," says Karl Newkirk, partner in charge of the SAP practice at Andersen Consulting in Cleveland. "Success comes from having a very clear idea of how you want to run the business and then using R/3 to enforce the way you've modeled it." Easier said than done, according to R/3 veterans. Drafting processes that will improve the business is difficult enough; the project team must also make sure those processes fit with R/3's own complex array of highly structured processes. "You don't want to get too far down the reengineering path without keeping R/3 in mind," says Nancy H. Bancroft, a computer consultant in Evergreen, Colo., and author of *Implementing SAP R/3* (Prentice Hall Inc., 1996).

Given the tectonic shift caused by all this behavior modification and intense planning, R/3 projects can either erupt in constructive upheaval or rumble on pointlessly for years. Most companies implementing R/3 are struggling to maintain their bal-

ance on that trembling ground. According to the experts, typical R/3 implementations fall into three broad categories as described in this article.

The Big Bang Strategy

STRUCTURAL REORGANIZATIONS often provide the catalyst for big bang R/3 implementations (the most common approach to R/3 implementation) in which companies cast off their legacy systems and implement a single set of R/3 processes across the company.

That was the case at Owens Corning, a maker of fiberglass reinforced composites and building materials systems located in Toledo, Ohio. R/3 became the technology driver to reduce the number of legacy systems from more than 200 to less than 10 and to create a single set of integrated supply chain processes across the company's 80 different manufacturing sites around the world.

Owens Corning is taking a slow-burn approach to the big bang. The project is being sliced up into four releases, each growing in scope and size until the final release, which will encompass the entire company, is completed in April 1997. Implemen-



A TOUGH SELL:
Lynda Mallinson,
team leader

PHOTO BY ANDY GOODWIN

Total Enterprise Management

Finally, there's a single answer to all of your enterprise management challenges.

New CA-Unicenter TNG.

The first open and independent software solution that covers all of your existing systems, networks, databases and applications. All your hardware. All your software. All your IT resources.

CA-Unicenter TNG makes it easy. With a stunning, real world interface that uses 3-D graphics to let you actually "fly" through your enterprise without leaving your desk. And innovative Business Process Views which let you view IT resources from a business perspective. It's the best way to transform IT information into intelligence.

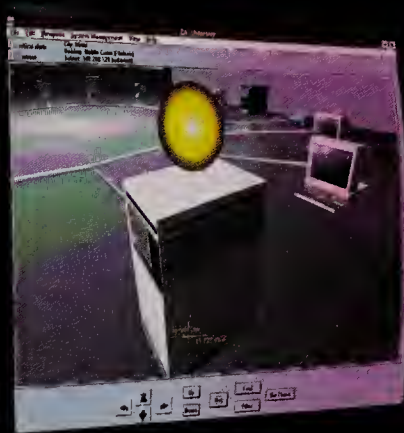
**Call 1-800-654-6118 For A Free TNG Video
And To Register For A Seminar:
Or Visit Us At <http://www.cai.com>**

Call today to learn more about the single, integrated solution for End-to-End Management. It's the technology of tomorrow — that's available today.

**COMPUTER[®]
ASSOCIATES**
Software superior by design.

Unic

prise ent



Now, there's an open and independent solution to
all of your enterprise management challenges.

New CA- enter[®] TNG[™]

©1996 Computer Associates International, Inc., Islandia, NY 11788-7000. All other product names referenced herein are trademarks of their respective companies.

The Implementer

AS A SELF-CONFESSED computer fiend, Sandra Blanckensee used to know the system at Fujitsu Microelectronics Inc. absolutely cold. Since the company went live with SAP R/3 in April 1995, however, all that's changed. "With SAP, you



Sandra Blanckensee
planning manager
for memory products,
Fujitsu Microelec-
tronics Inc., San Jose

have to resign yourself to the fact that you're in a training mode all the time." She adds: "It's so integrated and complex; I'm not sure we'll

ever understand it completely."

If that sounds like frustration, don't be misled. The depth and intricacies of the system keep her challenged and interested. "I'll spend at least an hour each day trying to figure out how to do new things on the system," she says. That, despite being quite expert in the system already (Blanckensee was a part-time member of the project team that installed SAP at Fujitsu).

Regardless of her interest in SAP, however, Blanckensee admits that the software's complexity and the seemingly constant wave of updates from SAP can be a torment, especially for those expecting to learn the system once.

"Just learning the small piece of SAP you need to deal with on a regular basis isn't enough," she says. "You have to understand the rest of the business, too. I tell people who are frustrated to learn the work first—you will come to understand SAP as you go along."

tation began with the corporate finance group in Toledo and then moved to two business units, which became incubators for nurturing a set of universal business processes designed to satisfy the overall project motto: simple, common, global.

The project team, which now numbers 250, swallowed up three floors of Owens Corning's office tower in Toledo in the spring of 1995. Centralizing the team and the decision making has helped maintain the global focus and has prevented any one function or business unit from dominating the discussion. Since so many complex decisions need to be made quickly—Owens Corning hopes to finish in 100 weeks—everyone works on top of one another. In addition, the proximity to big-wigs means that if a big issue comes up that the team isn't empowered to handle, the team members can kick it upstairs—literally.

The team is divided into five different process groups, each with representation from the local business units, IS and business people from across Owens Corning. Councils made up of representatives from all the teams ensure that each specific process meshes with the rest of the system. "Integration is the biggest advantage—as well as the biggest headache—of SAP," says David Johns, director of global development. "If you do one thing in the finance team, it affects everything else you do, so keeping the integration coordinated across teams is really difficult."

Keeping the business units informed, involved and happy when things are moving so fast in Toledo is also a big challenge. Team members representing the various business units are forced to weigh the quest for global integration in Toledo against the needs of the business units back home. One of the first implementation pilots to wrestle with that issue

was the Building Materials Europe (BME) unit in England. Lynda Mallinson, development leader of the BME team, spent three weeks in Toledo each month and a week back home talking to her business unit. "The links to the business unit got stretched," she says. "We didn't want the process team to appear to be sitting in an ivory tower telling them how to run their business."

The balancing act was especially difficult when it came down to the specific functionality of R/3. In most specific process areas, SAP is close



enough to best-in-class to not offend legacy loyalists (experts estimate that is true about 70 percent of the time). But in some areas, SAP falls short. Specifically, Mallinson's unit had developed a production planning system that outperformed anything offered by SAP. Chucking an excellent legacy system while taking a step back in functionality was a tough sell, she says.

Yet SAP never intended for R/3 to compete with best-in-class. The biggest benefits of R/3 are in its degree of integration—the process planning team must envision the possibilities. Mallinson's team did; with R/3, the production planning process was centralized across three of BME's manufacturing sites that previously had op-



Nothing is more uncomfortable than discovering your server is too small.



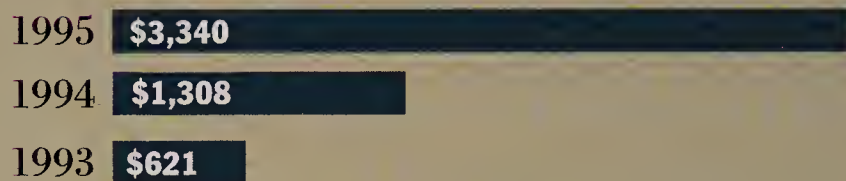
You buy a server, your company grows; you buy another server, your company grows. It's time to break this vicious cycle.

Introducing the Sun™ Ultra™ Enterprise™ Servers. The mainframe-caliber servers designed to grow as your company grows—without the usual cramps or compromises. Whatever your business needs, whether it's multiple-terabyte data warehouses or the ability to support thousands of users, Sun delivers. Best of all, you'll never wake up crammed in to a corner. Modular, scalable design lets you add CPUs and pump up I/O bandwidth as needed. Redundant, hot-swappable components, along with round-the-clock service and support, deliver the reliability to keep your mission-critical applications up and running. All of which adds up to enough network computing power to cover your entire business, no matter how quickly it grows. Sun Ultra Enterprise Servers. They're every reason you bought a mainframe, and every reason you didn't. To learn more, contact Sun at <http://www.sun.com> or call 1-800-786-0785, Ext. 390.



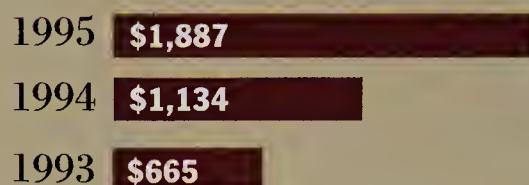
The Client/Server Enterprise Applications Market is Booming...

(*\$millions, worldwide revenues*)



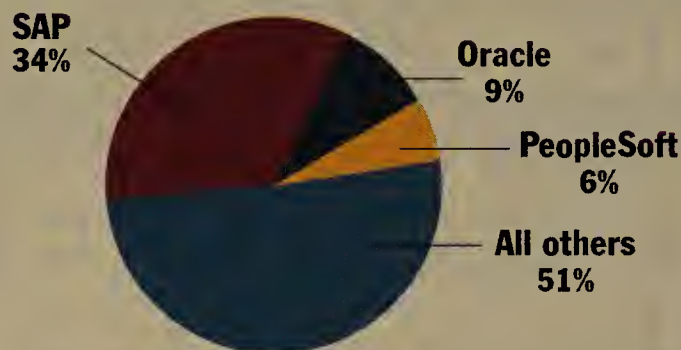
...and SAP AG Revenues are Soaring...

(*\$millions*)



...as SAP Gathers Top Market Share...

(*Share of client/server applications market worldwide*)



...in an Ever-Burgeoning Field.

(*1994 rankings of client/server revenues*)

COMPANY	PRIMARY SOURCE OF C/S REVENUES
SAP	Acct., HR, Dist., Mfg.
Oracle	Acct., HR, Dist., Mfg.
Computer Associates	Acct., Mfg., HR
PeopleSoft	HR, Acct., Dist., Mfg.
Hyperion Software	Acct.
Baan	Mfg., Dist., Acct.
Great Plains Software	Acct.
Dun & Bradstreet Software Services	Acct., HR, Dist.
Platinum Software	Acct.
Lawson Software	Acct., HR, Dist.

Acct.=accounting; Dist.=distribution; HR=human resources; Mfg.=manufacturing

SOURCE: INTERNATIONAL DATA CORP.

erated with independent systems. And with continuous upgrades pouring out of SAP headquarters in Wall-dorf, Germany, Mallinson could hold out hope that the gap in functionality would eventually be filled.

For Owens Corning, the overriding goal is not to perfect the functionality of the system but to develop processes that work well enough to install quickly what Owens Corning Vice President and CIO Mike Rad-cliff calls "good-enough reengineer-

SAP offers so many different options and sucks up so many **resources** in the company that it's *easy* to get **bogged down.**

ing." Too much tinkering turns the implementation path to mud.

"A project like this can take as long to implement as you want it to," says Johns. Indeed, tough scheduling seems to be the only reliable way to control most R/3 implementations. The system offers so many different options and sucks up so many resources in the company that it's easy to get bogged down. "It's like having the streets torn up; you start to figure you may as well change everything while you're at it," says Rad-cliff.

Top management, particularly CFO David Devonshire, keeps the heat on under the project. He installed a controller in Radcliff's unit to keep an eye on project costs, and he makes it clear that if a division wants to tear up a street that's not in the plan, it will have to find a way to pay for it. "These things really have to be hawked," he says.

Despite clear support from the top, however, the team had trouble keeping to the schedule early on.



They're
every reason
you bought a mainframe.

And
every reason
you didn't.

INTRODUCING
SUN'S NO-COMPROMISE ENTERPRISE SERVERS.
THE FIRST IN HISTORY
TO GIVE YOU MAINFRAME CALIBER COMPUTING
WITH THE BENEFITS OF OPEN SYSTEMS.



You bought a mainframe because of the reliability, capacity, throughput and control. But they lacked the flexibility, information-access and applications of client/server computing. Now, you can have the best of both worlds—the Sun™ Ultra™ Enterprise™ Servers combine the benefits of network computing with the capacity, reliability and control of a mainframe to give you an entirely new level of computing. Whether you need immense data warehouses or the ability to support thousands of users, Sun delivers. Up to 30 processors, 30 gigabytes of memory, mainframe-class I/O, and 10 terabytes of storage. And with the Solaris™ operating environment you get the ability to expand in all directions so you can have capacity on demand. Plus, you'll have the confidence of a system engineered with the industry's best reliability features; every major system component is redundant and hot-pluggable. Naturally, these systems are backed by world-class service, and round-the-clock mission-critical support. Factor in Solstice™ software, a comprehensive suite of tools and services, and you've got centralized control of your entire network. Thanks to our premier software partnerships, these servers are the ideal platforms on which to run all the leading business applications. Sun Ultra Enterprise Servers. The era of enterprise network computing is here. To learn more, contact <http://www.sun.com> or 1-800-786-0785, Ext.410.



SIEMENS

ROLM Communications

If you have any questions about our global capabilities,



SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

SIEMENS

MEI

Siemens AG
Vertrieb
Kommunikationssysteme und
Zweigniederlassung Frankfurt
Briefadresse:
Siemens AG, VKD M2
Postfach 11 17 33
60052 Frankfurt am Main
Hausadresse:
Rödelheimer Landstraße 5
60487 Frankfurt am Main
Tel. (069) 797-2979
Fax (069) 797-2442

Dipl.-Ing.
Claus Hansen
Leiter Systemvertrieb

Siemens AG
Kommunikati
Systemvertrieb
Zweigniederl
Postfach 11
10835 Berlin
Hausadresse
Salzufer 6-8
10587 Berlin
Tel. (030) 333-3333

Siemens SIA
Private Communication Systems
1 Vilandes Street
Riga, LV-1010
Latvia
Phone: +371 7 338120
Mobile Phone: +358 400 161 808
Fax: +371 7 338121
X.400: G=kari;S=mujunen;OU1=esp1;
O=siemens;P=scr;A=400net;C=fi

Kari Mujunen
Sales Director

SA
Yrigoyen 440 - Piso 2
Buenos Aires
Argentina

Ing. Francisco Reatti
Director de la División
de Comunicaciones

Tel. (011) 342-3091/331-1434
int. 4619
Fax (011) 343-7154

Siemens Atea
Private Communic

Arne Besseberg
Managing Director
Telecom Division

Siemens A/S

Oestre Aker vei 90
P.O. Box 10 Veitvet
N-0518 OSLO - Norway
Tel. +47 22 63 30 00
DID +47 22 63 37 61
Fax +47 22 63 32 96
Mobiletel. +47 92 04 44 41
Private:
Tel. +47 63 87 88 89

G. Van der Haeghe
Regional Manager Africa

Siemens (Pte) Ltd
Private Communications Systems
South East Asia

5 Tampines Central 6
#07-05, Telepark
Singapore 529482

Tel. : (65) 785 3569
DID: (65) 780
Fax : (65) 780

Siemens, Inc.
4/F Sterling Centre Bldg.
Esteban cor. de la Rosa St
Legaspi Villanueva

Siemens A.E.
T.O. 61011
151 10 Αμαρούσιο
Αρτέμιδος 8
Τηλ.: 6864227
Fax: 6864241
Telex: 21 6291

James V. Chapman
Strategic Business Manager

Siemens, S. A.
Dpto. Redes Pr
Ronda de Euro
28760 TRES C
Tels. (91) 803 1
Tel. 3338

Siemens SA
División Sistemas de Co
Privadas e Informática
Redes de Telecomunicacio
Hipólito Yrigoyen 440 - Piso 2
1086 Buenos Aires
República Argentina
Tel. (01) 342-3091/331-1434/343
int. 4766
Fax (01) 334-2512

Siemens, S. A.
Dpto. Redes Privadas
Ronda de Europa, 5
28760 TRES C
Tel. (91) 803 1
Tel. 3338

Maria Luisa García García
Ingeniero Industrial

Siemens Atea
Private Communi

Atealaan 34
B-2200 Herent
Tel. +32 14 25 21 43
Fax +32 14 25 32 92

Wim Vandevyver

Siemens Ned
Bedrijfstelecon
Prinses Beatrixla
Postbus 16068
2500 BB Den Haag
Tel. (070) 333 25 93
Fax (070) 333 29 05
Privé:
Tel. (079) 21 34 08

Dipl.-Ing.
Stefan Jutzi
International
Account Manager

Siemens s.a.
Telecommunication Division
Chaussée de Charleroi 116
1060 Bruxelles
Tel. +32 2 536 1
Fax +32 2 536 1
Telex 21 347

Dipl.-Oec. Univ.
Emil Heigl
Vertriebsbeauftragter

Siemens AG
Private Kommunikationssysteme
Systemvertrieb
Vertriebsregion Süd
Zweigniederlassung München
Briefadresse:
Siemens AG, PN SV1
80286 München
Hausadresse:
Richard-Strauss-Straße 76
München
Tel. (089) 9221-2716
Fax (089) 9221-3990
Mobil-Tel. 0171-2365596

IENS

©1996 Siemens Rolm Communications Inc. All other brand names or marks are used for identification purposes only and are trademarks of their respective owners.

The Super User

FOR KEVIN FUNK, booting up SAP is like ducking into the nearest phone booth to don a superhero suit. Make that a super "user" suit. Funk has an eye for business processes and a passion for complexity that allow him to use the powers of SAP to their



Kevin Funk
senior consultant,
International Consulting
Services (ICS), Deloitte
& Touche LL, Seattle

fullest potential. Funk's background is in accounting, and he's always enjoyed fitting processes to computers; he was involved in a couple of

systems implementations and reengineering efforts at The Seattle Times Co. But SAP was truly a showcase for his talent of keeping an eye on the invoice as it bobbed along in the business process currents. More important, it demonstrated his ability to teach others how to judge the currents. "You can't just show people how to operate the system," says Funk. "They need a sense of what happens in the different processes and why the system works the way it does."

Super users like Funk are invaluable to an SAP project, which is part of the reason he was snapped up by ICS, Deloitte & Touche after 13 years at the Times Co. and given a 35 percent salary increase. "You need to have the skills of the super user and then some," Funk says of SAP consulting. "The client doesn't know you're a super user; you have to prove it each time."

The darkest hour came in August 1995 when Johns pulled the entire team off the project for an exhausting two-day summit. "We called it the Nuremberg trials," he says. "Up to that point, there had been an underlying attitude that this was like every other systems project—if something wasn't going right, the schedule could always slip a little. We spent a very significant two hours making sure everyone knew that this was not to slip behind schedule."

Two intense hours became two tense days. Undercurrents of resentment between IS staff and the business people were revealed—undercurrents that bubble beneath most big R/3 projects. When implementation began, the business people fell back on old habits and ceded responsibility to IS, which accepted it a little too eagerly, leading to delays and bickering.

"The IS people felt that the business people weren't taking on enough accountability, and the business people felt they weren't being listened to," says Johns. After airing differences at the two-day summit, however, the project team regrouped. "From the beginning, we had been excited by the possibility that this wouldn't be the usual throw-it-over-the-wall approach to building a system," says Johns. "[The summit] was the first point at which IS and the business truly began to feel that they were in this together. The friction

between us melted away after that."

After a grueling summer and fall of process crunching and planning, the BME division pilot went live in January 1996. "We flipped the big switch on a weekend, expecting problems," says Mallinson, "but we came in on

“We flipped the big switch
on a weekend,
expecting problems,
but we came in
on Monday
and it was working
fine.
We started feeling
brilliant.”

—Lynda Mallinson

Monday and it was working fine. We started feeling brilliant," she laughs.

But by Tuesday, strange things began happening. "It was like a wave rolling through the system," she says. As employees began tentatively entering orders, mistakes flowed and multiplied through the system. Production tried to fix the mistakes made during the order-entry process but added a few mistakes of its own along the way, and so on down the line.

The extraordinary integration that Owens Corning had hoped for with R/3 had arrived—and it was over-

SAP BOOKSHELF

Implementing SAP R/3

by Nancy H. Bancroft, Prentice Hall
ISBN 0132621711

Client/Server Development With SAP's ABAP/4 Development Workbench 3.0

by Thomas Curran, Prentice Hall (due
out July 1996), ISBN 0135253950

Customizing SAP's R/3 Applica- tions With ABAP/4

by Rudiger Kretschmer, Sybex Inc.
ISBN 078211881X

The SAP R/3 System:

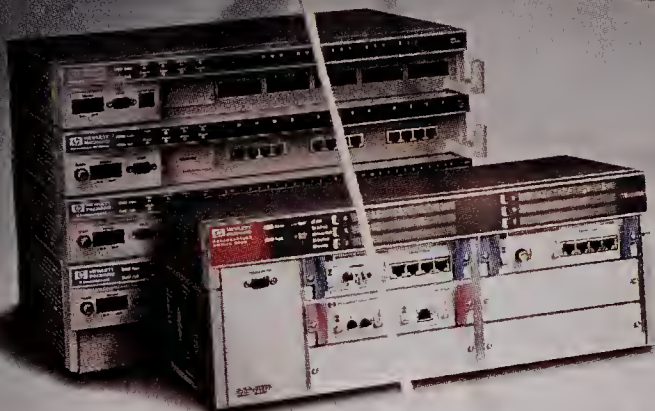
A Client/Server Technology

by Rudiger Buck-Emden and Jurgen
Galimow, Addison-Wesley Publishing
Co., ISBN 0201403501

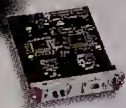
Using SAP's R/3 Client Server Business Process Blueprint Tool

by Thomas Curran and Gerhard
Keller, Prentice Hall Inc. (due out
August 1996), ISBN 0135211476

SOURCE: COMPUTER LITERACY BOOKSTORES



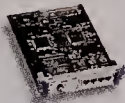
ADVANCESTACK HUBS AND SWITCHES



100VG. High-performance, multimedia and time-sensitive apps



100Base-T. High-performance switch to switch or switch to server. Coming soon



10Base-T. Switch to 10Mb/s and easy migration to high performance



FDDI. High-speed connectivity

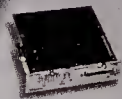


CISCO. Future router integration

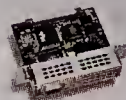


ATM. Coming soon

SWITCH MODULES



Router 210. Connectivity to remote site



SNMP. Intelligent network monitoring and performance optimization



Dial-A-LAN. Dial-in/Dial-out remote access

HUB MODULES



REMOTE PC



REMOTE PORTABLE

WITH NETWORKS, THINGS CHANGE. SO CAN WE.

The future of networking belongs to products that can take change in stride, and keep on going. Instead of turning into expensive doorstops.

That's why modularity is at the heart of HP's hubs and switches. It combines flexibility with economy, resulting in an altogether superior product line.

What else would you expect? We live and breathe network engineering.

For detailed specs, visit http://www.hp.com/go/network_city. Or call 1-800-533-1333, Ext. 1615.

The Change Agent

OWENS CORNING doesn't worry about change management. That's because it exists, basically, in one person. David Johns must coordinate SAP delivery across



David Johns
director of global
development, Owens
Corning, Toledo, Ohio

five different
project teams
on time and
on budget.

Beyond
keeping 250
different team
members fo-
cused and

working together, he ensures that the project goals of "common, global and simple" aren't shoved down the throats of Owens Corning business units around the world, since it would be relatively easy for the Toledo-based team to huddle and make SAP process choices for the company unilaterally.

"You'll always have variations in processes at the business unit level with SAP, particularly around customers," says Johns. "It's my job to make sure the variations are the exception rather than the rule. It's a constant struggle."

This task isn't made any easier by the 100-week project schedule, which is beyond aggressive—it's brutal. But a survivalist camaraderie among team members and a heightened sense of visibility at the company has emerged. The bigwigs know when Johns and his teammates put in 70-hour weeks, which helps propel him through those weeks. "It's the kind of opportunity you hope for when you join a company—to impact the way it works," he says.

whelming. The integrated data flowed so quickly through the system that there was little opportunity to track down mistakes before they showed

By openly recognizing
the changes
required of its employees,
the company crossed
one
of the major hurdles
of implementation.

up on everybody's screens. "Mistakes are very visible with R/3," says Mallinson, "and people's efforts to go back in and try to correct those mistakes are very visible too. SAP likes you to enter information the right way the first time; it doesn't offer easy ways to go back in and correct things."

By the second week, the waves had reduced to ripples, but Mallinson was surprised at the extent to which the trained users depended upon the so-called "champions" or "super users," business people trained to be the local system evangelists for their co-workers. "We did a lot of training, but it happened just before implementation, and people became very dependent," she says.

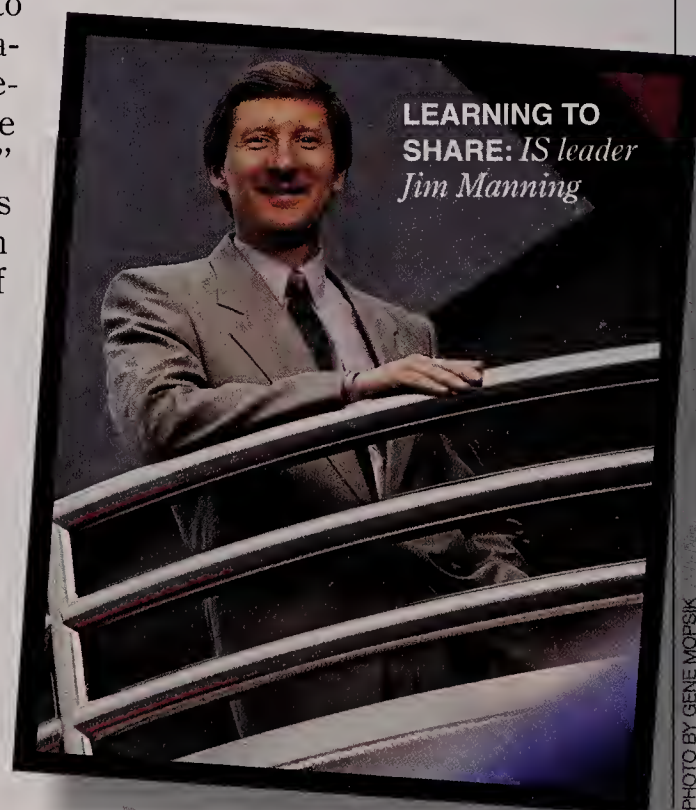
Owens Corning's experience is not unusual. Training is proving to be one of the biggest implementation surprises, both for those designing the system and for those using it (see "Surprise, Surprise," Page 58). Owens Corning estimates that training costs will more than double, from an original budget of \$3.1 million to \$7 million, or 10 percent of the \$60 million to \$70 million estimated total cost of the project. "You're really creating a new set of skills and a much more literate workforce," says Devonshire. "People not only need technology literacy, but they need to understand the business processes."

By openly recognizing the changes that will be required of its employees as well as its pro-

cesses, the company has crossed one of the major hurdles of implementation as it begins work in the company's other business units. That attitude seems representative of Owens Corning's view of R/3—that it is too big to be perfect. Company leaders talk openly about problems—which means they are addressed quickly—and everyone is too busy to point fingers. "For the first time, we have true co-leadership of a systems project," says Johns. "Owens Corning will never do another project like this without co-leadership."

The Franchising Strategy

THIS APPROACH SUITS large or diverse companies that do not have enough common processes across business units to do a big bang implementation. Independent R/3 systems are installed in each unit, linking common processes across the enterprise as seems appropriate. For big, decentralized companies that choose to do multiple implementations of R/3, building a stockpile of accumulated learning and experience is the only way to save time



LEARNING TO SHARE: IS leader
Jim Manning

PHOTO BY GENE MOPSIK

"Dress-Down Day" starts on Monday



Dialup Access To LANS For Less

Features that others don't have—

- ◆ **Fault Tolerant**
Failed transmissions automatically resume on another port or another WorldDesk Commuter.
- ◆ **Built-in Security**
Authentication Server built-in. No need to purchase separate security solution.
- ◆ **Built-in Modems**
Up to 12 per unit.
- ◆ **Low Cost Per Port**
Call! You'll be very pleased.



WORLDDESK
COMMUTER

Bringing the world together...again!

 **CUBIX**

1.800.953.0136

Cubix Corporation, 2800 Lockheed Way, Carson City, NV 89706-0719 USA
Tel (702) 888-1000 Fax (702) 888-1001 <http://www.cubix.com>
Cubix Corporation Europe Ltd., 1 Hunter Road, Kirkton South, Livingston, Scotland EH54 9DH
Tel (44) 1506 465065 Fax (44) 1506 465430 France Tel 05908114 Germany Tel 0130815193

You can also reach us by e-mail at ibmsurvey@upgrade.com. In Canada, call 1 800 IBM CALL ext. 8119. The IBM home page is located at www.ibm.com. IBM, OS/2 and AIX are registered trademarks and Solutions for a small planet is a trademark of International Business Machines Corporation. Windows NT is a trademark of Microsoft Corp. Lotus Notes is a registered trademark of Lotus Development Corp. © 1996 IBM Corp. All rights reserved. "The Three Musketeers" TM & © 1939, 1996 Twentieth Century Fox Film Corporation.



It never works
as well without
the middle.



Presenting
IBM Software Servers.
Now the client/server
picture is complete.

It's amazing how well client/server computing can work. Especially when you put something between your clients and servers that makes everything work together more smoothly. That's why we created seven new IBM Software Servers. They support all major clients, and they'll run on the platform of your choice: OS/2®, Windows NT™ or AIX®. And best of all, they're designed to work together seamlessly. All for one and one for all. For your complimentary Preview Kit, visit www.software.ibm.com/info/gel25/ or just call us at 1 800 IBM-7955, ext. gel25.

Lotus Notes®

The leader in messaging
and groupware.

Database Server

Helps workgroups and companies
share important data.

Internet Connection Server

A solid foundation for
building Web-based business.

Communications Server

A powerful gateway for
connecting diverse systems.

Transaction Server

A flexible infrastructure for
mission-critical applications.

Directory and Security Server

Manages companywide users and
resources from one desk.

Systems Management Server

Automates management of
multivendor distributed systems.



Solutions for a small planet™

and money on the work.

At E.I. du Pont de Nemours & Co., for example, the business units are too diverse to link everything together in R/3, and the company is opting to "franchise" its R/3 systems across the company with an unusual approach. Rather than bulk up on outside consultants, the Wilmington, Del.-based manufacturer is training staff from its corporate IS group to work with the IS and business people in each business unit, according to Linda

**Dupont's team
did not
have the luxury of
blowing
away
legacy systems.**

Lewis, R/3 manager in DuPont's SAP Americas group.

DuPont's SAP commandos receive between six and nine months of formal training and hands-on experience in the system, and many have had experience implementing DuPont's R/2 legacy system. That experience is paying off in DuPont's R/3 pilots in the "nonwoven products" strategic business unit. One pilot is in the Tyvek business unit, which manufactures the material used to make those lightweight, indestructible mailing en-

Surprise, Surprise

And you thought redesigning your business processes was going to be tough...

PERHAPS THE BIGGEST BLUNDER companies make when reengineering is to assume that jobs—and people—can be redesigned as easily as business processes. That blunder is magnified when SAP's R/3 becomes the tool for reengineering.

"People are one of your biggest hidden costs with R/3," says Karl Newkirk, partner in charge of the SAP practice for Andersen Consulting in Cleveland. Without proper retraining, Newkirk estimates that 30 to 40 percent of front-line employees will not be able to handle the demands of the new system. R/3 transforms order-entry clerks into business people, requiring that they have a clear-eyed view of how their data affects the rest of the company.

"The people at the keyboards are now making decisions—and committing the company to decisions—about buying and selling," warns Nancy H. Bancroft, an independent consultant and author of *Implementing SAP R/3*. "Managers need to be prepared to let go of some of what used to be their responsibility and encourage people to be able to make those decisions themselves."

But the training challenge isn't just a matter of bumping up end-user skills, it's also a matter of expect-

tations. Companies go into denial as projects come to an end and SAP consultants prepare to leave, thinking all the handholding and training will somehow continue. It doesn't. Furthermore, SAP's own telephone and on-line support systems are focused on implementation and trouble-shooting rather than on user support.

With post-consulting withdrawal so common, most successful R/3 installations take care to groom "super users"—staff members who can help with user crises and build support for the new system. "You can't just ship everybody off to SAP school at the end of the project, because that school doesn't exist," notes Ruth Westra, financial systems coordinator and super user at the Seattle Times Co.

Most companies also fail to realize the sheer breadth of the training requirements. "If we have a plant of 160 people, we'll probably need to train 130 of them," says Jane L. Breckenridge, who runs SAP training for Hercules Inc., a chemical manufacturer in Wilmington, Del. Breckenridge says that each of her end users required 20 to 25 hours of classroom training before they were ready for R/3 in 1995. The only way to save on training, she says, is to fold past training experience into each new phase of implementation. "It's best to centralize the training so that each location doesn't try to reinvent it during implementation," she says. "By centralizing, you can incorporate all the accumulated learning into each implementation."

—C. Koch

MOVE TO CLIENT/SERVER

REDUCE THE RISK

TEST

WITH THE LEADER.

DON'T BUST YOUR HUMP

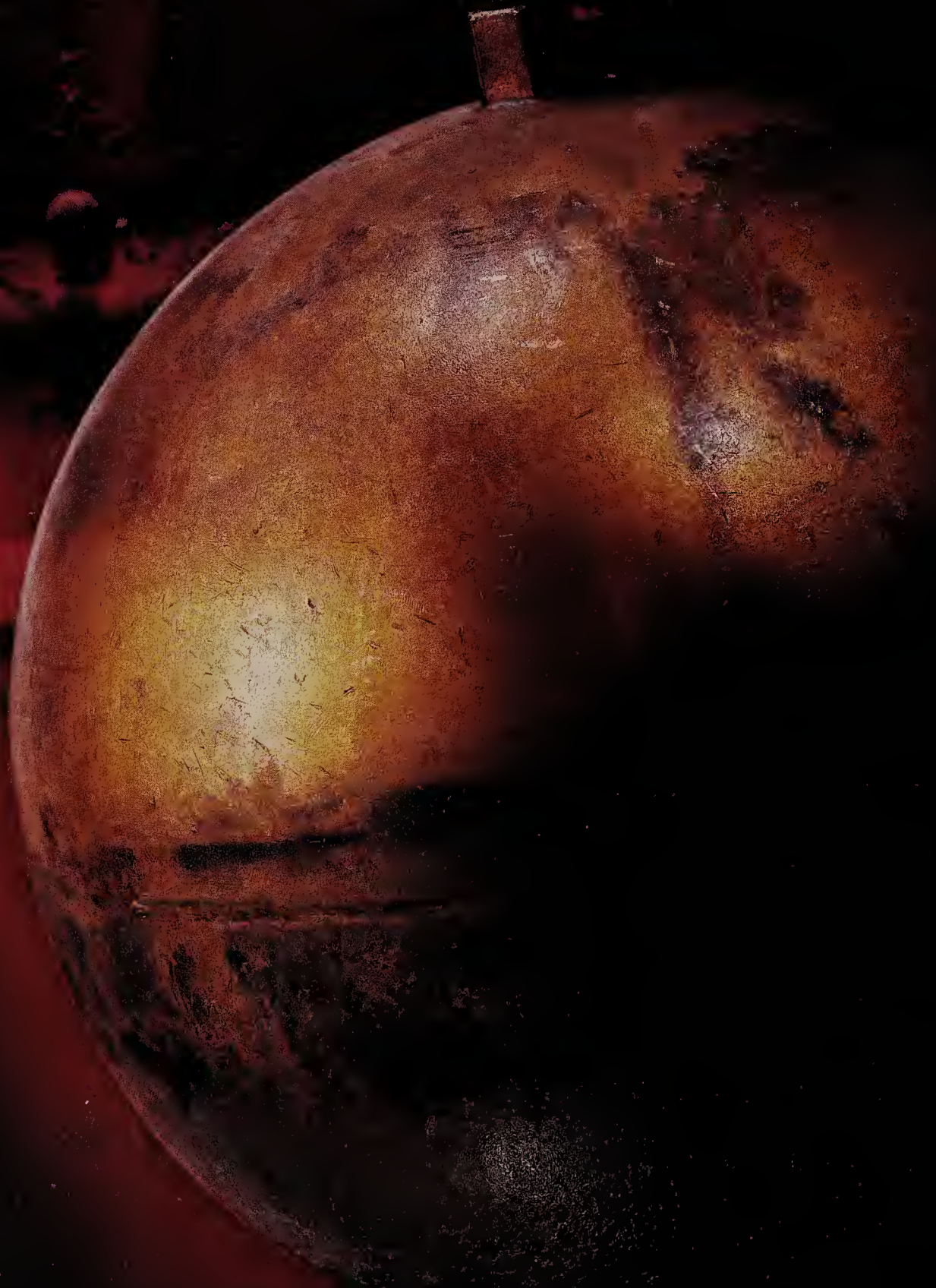
Stop risk in its tracks when deploying mission-critical applications, with Automated Software Quality tools from Mercury Interactive. Because no other product suite tests, benchmarks and tunes GUI clients, middleware and servers better than ours. No surprise then, that 41% of the software testing tools in use today wear the Mercury Interactive name.* When we say this stuff works, it works. Call today for our new Risk Management Kit and find out for yourself. 1-800-TEST 911

mercury
interactive

Making Client/Server Work

Microsoft

WHERE DO YOU WANT TO GO TODAY?™



Will the Internet bring an end to business computing as we know it?

Not at all. It will simply knock down the walls between people, between departments — even between companies.

The promise of the Internet, while intoxicating to some, is threatening to others. Because along with the unlimited access and opportunity it provides, comes the need for new strategies and new technologies. Happily, those who've begun the transition to client-server already have much of what they need in place. And to help businesses incorporate the Internet and intranet into their operations, Microsoft is integrating the necessary technology into many of its products — from desktop to server to tools.

For example, it's never been easier to connect desktops to the Internet. That's because both Microsoft® Windows® 95 and Windows NT® Workstation operating systems have all the "plumbing" built right in. Viewing content is just as effortless. With Microsoft Internet Explorer, users can browse the Internet (or internal corporate webs) whether they're working on the Windows platform or on the Macintosh.™

Of course, making web content easy to view is only the beginning. To be useful to organizations, content has to be easy to create, too. Which is why the latest generation of Microsoft Office applications, along with Internet Assistants, allow users to develop web content without programming. They simply save their work as HTML, the way they would any other document. Such ease-of-use also extends to the newest member of the Microsoft Office family, the Microsoft FrontPage™ web authoring tool, which lets users create and manage entire web sites, even if they've never so much as programmed a VCR.

The Internet is very much a part of our BackOffice™ family, too. With Microsoft Internet Information Server, we've extended the performance of Windows NT Server to make the ideal Internet platform. Now every organization can host and manage web content and applications securely and reliably. And, with Microsoft Exchange Server, secure and reliable e-mail is also a reality, whether it's traveling over the Internet or within your organization.

The truly interactive web page has arrived as well...and with it, full motion video, audio and moving text. Advances made possible by technologies like ActiveX™ controls, which let developers embed sound, video, and applications without having to learn new languages.

Yes, the walls are coming down, but it's not the end of business computing. Just the next, most practical evolution.

To learn more, or to download our free Internet products, visit <http://www.microsoft.com/internet/go1/>

Marketing Genius

SAP AG grew more than 70 percent annually for six years bypassing IS and selling to CEOs

SIT IN ON AN SAP-SPONSORED SEMINAR for executives put on by industry showman and professor John J. Donovan, chairman of Cambridge Technology Group in Cambridge, Mass., and the marketing genius of SAP becomes crystal clear. Comment after comment, CEOs' statements—laden with frustrations—are trotted out for the audience's review. Like the easily converted in an old-time religious revival meeting, executives in the audience may become believers that IS departments should stop studying those ROI reports.

"There is no return on these [SAP] projects," says Donovan. "Everyone is looking at this investment the wrong way and doing the wrong analysis, calculating the replacement of one system for another. SAP is the infrastructure. What is my return on putting electricity in this building? There is none; I just have to do it."

To the IS executive, that sounds just plain crazy. CIOs and their CFO mentors learn to lean on return on investment, not leaps of faith. For the CEO, however, a leap is all it takes to get an SAP project started.

"Basically, SAP has bypassed the IS department," says Alice H. Greene, an industry analyst at Industry Directions in Newburyport, Mass. "Instead of doing a technology sell, SAP has gone to the economic buyers [CEOs and CFOs] and convinced them that this software was going to change their businesses."

This understanding may have been SAP's secret marketing weapon. "An SAP project will change lots of people's jobs, and the IT executive alone cannot effect this change," explains Karl Newkirk, partner in charge of the SAP practice in North and South America for Andersen Consulting in Chicago. Only executives who are standing on a burning platform will have the impetus, and the stamina, for weathering the kinds of changes that SAP will induce, says Newkirk.

—E.B. Baatz

velopes; the other is in the Suntara business unit, which makes a fabric used primarily for protective medical clothing. The pilots began concurrently, with Suntara's starting in the United States and Tyvek's in Europe. By the time Suntara began work in Europe, Tyvek was almost done. "Tyvek

was able to share people and experience with Suntara to accelerate its project by at least a year," says Jim Manning, business information systems leader for the nonwoven strategic business unit (SBU).

Once the pilots at Suntara and Tyvek are completed, says Lewis,

DuPont hopes to integrate the key supply chain modules of R/3 across the entire nonwoven SBU, including sales and distribution, materials management and production planning. It won't be easy. Unlike big

“You can solve the **infrastructure issues** a whole lot easier than the **business-process issues.**”

—Dave Rust

bang projects, the DuPont team doesn't have the luxury of blowing away its legacy systems.

For R/3 to hook up with a legacy system, it's important to minimize redundant data processing. That means apportioning the pieces of a process carefully. For example, in the order/ship/bill process, the team had to divide the process between

ON THE WEB

A FAQ page for SAP users:

<http://www.Informatik.Uni-Oldenburg.DE/~bartelt/sap/sap-faq.html#miscellaneous.abap>

SAP America Inc.'s home page:

<http://www.sap.com/>

Maxit Corp. offers CD-ROM-based R/3 training:

<http://www.maxit.com/training/sapmain.html>

Fabian Geyer's SAP home page:

<http://nobile.wirtschaft.tu-ilmenau.de/text/r3/r3links.html>

SAP background and links:

<http://www.ozemail.com.au/~adbell/saprectr.html#sconsult>

American SAP User Group (ASUG) sponsors an online forum for members on CompuServe:

Go:SAP



THE INFORMATION HIGHWAY IS PAVED
WITH RHETORIC, METAPHORS, AND THE SCAR TISSUE
OF MISINFORMED EXECUTIVES.

The rush is on to do business on the Internet. What will separate the winners from the losers?

One of the deciding factors will be your alliances with strategic network partners. Partners that can help you capitalize on the power of the Internet. A partner like Cisco Systems.

Cisco helped pioneer the Internet.

Today, almost every message that travels across the Internet moves through Cisco equipment.

In fact, it's our Cisco IOS™ software that enables the different hardware devices and companies to share data on the Internet. All of which makes Cisco uniquely qualified to construct the infrastructure your company needs to

deploy the Internet for marketing, customer support and sales.

So visit us at www.cisco.com, or call us at 1-800-778-3632, ext. 159101.

We can help you from becoming a statistic on the information superhighway.



THE NETWORK WORKS.
NO EXCUSES.™

The Decision Maker

GOING TO THE BOARD to ask for a 100 percent budget increase for Pacific Gas and Electric Corp.'s SAP project wasn't fun. But Se-



Gordon R. Smith
senior vice president
and CFO, Pacific
Gas and Electric Co.,
San Francisco

nior Vice President and CFO Gordon R. Smith appears to be, well, modestly comfortable with the \$70 million his company

has doled out. "We spent about \$10 [in implementation costs] for every dollar of software purchased, so I was pleased that we were not spending \$20 for every dollar," says Smith. "But we did a poor job of forecasting the budget two years ago," he admits. "We hadn't done a major systems replacement in 25 years, and we didn't have experience in predicting what a project like that would cost."

The budget overrun could have killed the project, except that top executive commitment was strong. Frequent communication was critical.

With budget numbers doubling, Smith says it means a lot to him that PG&E picked a software vendor that has come out on top. Three years ago, "it wasn't clear that SAP would be the leader it is today, so we feel darn good that we picked it," says Smith. "I'd hate to be going through all this grief for something that wasn't as good or world-renowned as SAP."

R/3 and DuPont's regional computing network, made up of R/2 and other legacy systems that control corporate financials for all the business units. "If you break that puppy in the wrong place, you've got problems," says Manning. "When you take an order in R/3, you have to duplicate all that processing in R/2 to get at the data. To minimize the redundancy, we had to keep the order cycle on R/3 all the way down to the invoice and then do the receivables in R/2."

DuPont's legacy issues combined with the complexity of its business unit structure mean that the company won't be setting any speed records for SAP implementation. So far, the team has determined what the basic R/3 architecture will look like across the business units and which combination of hierarchies (local SBU, regional or corporate) will reside on each client computer. What remains to be resolved is how much of the R/3 data will be integrated across all SBUs and

"If we tried to justify SAP on an ROI basis, then it probably wouldn't make sense."

—Liz Zajic

how much will be local. That issue promises to stretch the timeline. Each SBU will have a hand in determining its own strategy as well as allocation of people and resources, according to Lewis.

Meanwhile, consulting firms crowd about 60- and 90-day implementations—no doubt to ameliorate the lingering impression in the IS community that SAP projects drag on forever. DuPont's team leaders are frustrated by all the time talk. "If you're not changing anything, you can get it in there real quick," says

Dave Rust, corporate IS project manager assigned to Tyvek. "But if you have legacy systems or you have to redesign processes, it's difficult. You can solve the infrastructure issues a whole lot easier than the business-process issues."

The Slam Dunk Strategy

THOSE COMPANIES THAT play for the slam dunk in R/3 tend to feel secure about the way business is currently done. The goal is to get R/3 up and running quickly and to ditch the fancy reengineering in favor of R/3's "canned" processes.

R/3 dictates the process design in this method, where the focus is on just a few key processes, such as those contained in R/3's financials module, for example. The slam dunk is generally for smaller companies expecting to grow into R/3.

Accugraph Corp., an El Paso, Texas-based software manufacturer, has done one of those 60-day implementations the SAP consultants like to brag about.

Although common wisdom says R/3 is best for big manufacturing companies, Accugraph clearly doesn't fit the standard profile. It's relatively small—\$22 million in revenues last year—and it doesn't do much in the way of manufacturing, aside from stamping out CDs.

But it does have a few characteristics that make R/3 attractive: rapid growth combined with an increasing number of international sales offices around the globe that can benefit from SAP's facility with different languages and currencies.

President and CEO Dennis McGinn also believes that R/3 will help Accugraph meld with its big customers. "A number of our large customers want our system to integrate with theirs," he says. "It puts us at a different level in the eyes of our customers."

The other advantage for Accugraph

Now everyone can manage the power of information!



MI³MS 3000™ Plus
Minolta Image & Information
Management Systems

Information is power. Until information overwhelms you. Then it stifles productivity, dulls your competitive edge and drives up costs.

MI³MS 3000 *Plus* streamlines management of all of your information.

Paper documents. Faxes. Microfilm. Text files. Mainframe reports. MI³MS can integrate all of these items into logical documents stored on optical disk.

Now you have all of your mission critical information in the form you need it – digital. Where you need it – enterprise-wide. When you need it – immediately.

Our workflow application heightens productivity. Windows™-based open architecture makes installation and training easy. Expert service and support give you the scaleable, customized solution you need.

In more than 2000 installed systems worldwide, Minolta Imaging Systems are proving that now you can manage all of your information in ways you've never imagined.

Call 1-800-9-MINOLTA

Information becomes totally manageable thanks to these MI³MS 3000 Plus features:

- P.A.T.H. 3.0 software easily adds software for expanded applications such as OCR and text search.
- TIFF-JBIG compression reduces storage, network communications and telephone costs by compressing files up to 200% more than CCITT Group 4 compression.
- I.C.E. software downloads internally generated reports and documents, storing them in MI³MS folders.
- DocRoute™ for MI³MS 3000 *Plus* is Windows-based and provides a seamless workflow application with intelligent routing, e-mail notification and status tracking.

*Copiers
Cameras
Faxes
Digital Systems
Document Imaging
Camcorders
Binoculars
Color Sensors*

*Only from the mind
of Minolta*



MINOLTA

© 1996 MINOLTA CORPORATION, INC.
All trademarks and registered trademarks are property of their respective holders.

ON THE FLY:
SAP analyst
Liz Zajic



is that, being a small company, it didn't need to change much to implement R/3's financials module—that was part of the deal with SAP. Accugraph purchased an R/3 package called Special Delivery, which included R/3's financials module, as well as the consultants to do the job, with one caveat: The team ruled out any reengineering. Elapsed time was 59 days. (Sluggish sales and client discomfort with the all-in-one concept have since prompted SAP to drop the Special Delivery concept, although the quick implementation strategy survives.)

Timing was an overriding factor, says Liz Zajic, SAP analyst, because Accugraph's mainframe-based financial system was near collapse. Consultants also goosed the speed by training the in-house staff on the fly. That wasn't a liability, says Zajic, because the scope of the project was so limited.

Accugraph's size also was a factor. Many aspects of implementing R/3 that require individual attention at larger companies can be rolled together at Accugraph, such as change management and training, for example.

"We've been training managers to use the system and encouraging them to begin monitoring their budgets online at the same time, rather than requesting reports through me," says Zajic. "We're small enough that I can do [the change management] myself."

Despite such advantages, Zajic and others at Accugraph don't have any illusions about R/3's impact on the bottom line. Limited implementations of R/3, though quicker and less costly than a big bang solution, certainly don't pay for themselves in a year.

"If we tried to justify it on an ROI basis, then it probably wouldn't make any sense," she says. "But what we're trying to do with R/3 is create a corporate financial information tool rather than another accounting system."

If Accugraph can offer better quality information to more people at the corporate level, that has value, she reasons. R/3's potential for growth and expansion also means Accugraph won't have to switch accounting systems as it grows and becomes more international.

Indeed, Accugraph is already stirring more into its original R/3 con-

SAP ONLINE

If you enjoyed these articles about SAP, then join us online to meet the SAP experts, SAP executives and your CIO peers who have appeared in these pages. From June 17 to July 3, a special Interactive Article Forum on SAP will be running on the Web at <http://www.cio.com/forums/SAP.html>

Come ask questions online of the expert panel:

Eileen Basho, VP of Professional Services, SAP America Inc.

Bobby Cameron, senior analyst in Packaged Application Strategies, Forrester Research Inc.

Jeremy Coote, president, SAP America Inc.

Walter Curd, director of IT, Fujitsu Microelectronics Inc.

David Johns, director of global development, Owens Corning

Bill Kredel, CIO, Autodesk

Karl Newkirk, partner in charge of SAP practice, Andersen Consulting

coction. Next for Accugraph is the sales and distribution module.

While the companies that have installed SAP R/3 are a very diverse lot, it is clear that, regardless of the size or scope of the project, enterprise software systems such as R/3 effect big changes. For Fujitsu Microelectronics, which completed a big bang implementation in April 1995, the project changed the IS function's role in the company, says Walter Curd, director of information technology. "We've become a project management organization rather than a programming organization. I asked my people if they thought that was a more exciting role for them and they all said it was," Curd says. "It's definitely a new role, but it's a much better one." 

Senior Writer Christopher Koch can be reached at ckoch@cio.com.



Ernst & Young and Tata Consultancy Services

Have Joined Forces To

**Take Global Consulting
To The Next Level.**

Ernst & Young and Tata Consultancy Services (TCS) have formed an alliance to serve global customers, creating a unique worldwide capability, 15,000 consultants strong.

Beyond size is scope — this alliance combines the technical expertise and complementary strengths of two recognized leaders at the forefront of Global Business Transformation, Information Technology, Knowledge Management, and large-scale Reengineering.

Together, Ernst & Young and TCS will deliver seamless, total solutions — with unrivaled integration of people, processes, and technology — on a global scale.

For more information call Dave Bonner at 214-665-5052.



“Funny,

I thought my

job description

said

MIS manager

not

test pilot.”

HELP

Uh-oh. It's time to start designing a client/server network. All in the line of duty, of course. The trick is to do it somehow without risking your life.

The problem can be summed up in a few words. Words like “danger.” And “why me?”

Wouldn't it be nice if you could see exactly how things were going to work before rocketing headlong into a sky full of question marks?

That's what we thought.

At IBM, we've spent years helping a wide variety of companies find an even wider variety of client/server solutions. Recently, we took what we've learned over those years, the accumulated wealth of knowledge, solutions, ideas, inspirations and innovations, and published them on a Lotus Notes® database.

We call it the IBM Client/Server Advisor System™, and it puts a vast reservoir of knowledge within easy reach. So whether you have to design a system for sales

and marketing, human resources, manufacturing or finance, you can start from a point of knowledge and experience. Together, we can devise a solution for your business by looking at the ways in which other businesses satisfied similar needs.

Of course, simply having a solution isn't exactly the same as having a solution that works for you. So we created Open Systems Centers (there are 42 of them around the world). There, we can get more specific, design a tailored solution and test it in a real-life multivendor environment. So you'll see just how it will work in your company.

All of which means that instead of worrying about the risks, you can start focusing on the opportunities. To find out more, visit www.ibm.com or call [1 800 IBM-7080](tel:1800IBM7080), ext. G 130, for a free 16-page booklet.

Then sigh with relief.

Solutions for a small planet™



Banks on Balance

PREPARING
FOR CHANGE

Retail banking is moving out from behind marble counters and glass teller cages into a customer-driven future of made-to-order financial products and swifter service

BY MICKEY WILLIAMSON

Having just selected the Martian Macrovan of his dreams, Ivan Hazenov slides his smart card through the magnetic reader attached to his TV/monitor/Internet machine and points to the display button marked "Loan Officer, Female." A voice, silky but businesslike, pours out of wall-mounted speakers: "How

can I help you, Ivan?"

In less time than it takes Ivan to brush his teeth, his application for a car loan is approved. He slides his card through the slot again to receive the loan. Minutes later, a driver for the Martian dealership is at the door with Ivan's Macrovan. Ivan slides his card through the driver's

THUMBNAIL

Industry: U.S. retail banking

Primary Products: Loans, time and demand deposits

Industry Revenues:
Approximately
\$49 billion net in 1995

Number of Players: Approximately
10,000 banks with 60,000 branches



SOURCE: SHESHUNOFF INFORMATION SERVICES, INC., AUSTIN TX





FORCES OF CHANGE

Low-cost, high performance technology:

When it comes to bells and whistles, home computers outpace those in corporations, with prices dropping sharply. With 30 million home computers installed in the United States and low-cost Internet machines on the way, Internet access will become nearly ubiquitous.

Impact: Banking from home appeals to busy people reluctant to spend time paying bills and waiting in bank lines. Banks see electronic commerce as a way to reduce paper handling costs, cut the number of employees and close branches.

Increased competition: Financial services and technology companies encroach on banking's traditional turf. Regulation makes it difficult for banks to fight back. Customers shop for banks without leaving home.

Impact: Customers and profitability grow in importance. Banks must emulate retailers, track customer preferences and find ways to cross-sell products and services. Low- and no-profit services are moved out of bank branches and onto the Internet. Data mining and efficient processes become high-priority.

Regulation: Much depends on what legislators do to the current regulatory climate. Some deregulation seems certain, but no one knows how much.

Impact: A completely deregulated banking industry could fight back against incursions, selling insurance and equities to start, with unlimited potential for entry into other fields. But it also might mean the end of deposit insurance, robbing banks of one component of the trust they now enjoy.

mobile card reader, transferring his payment to the dealership's account, and thinks how the most stressful aspect of the transaction was making up his mind about which vehicle to choose. The bank part was easy.

If you're old enough to remember when banks were all marble and mahogany, and the people inside spoke in hushed tones and called each other Mr. and Mrs., your head will spin when you see what's coming next. Even if you're only old enough to have just gotten used to carrying a wallet and having change in your pocket, the times, as the song goes, they are a-changin'. High speed PCs, smart cards and imaging technology—it's a whole brave new world out there.

Banks must adapt to a profusion of changing conditions, only one of which is the heightened ability of potential customers to get the best deal by shopping on the Internet. Since the start of bank deregulation in the United States in 1984, other parts of the financial industry have been muscling in on banks' territory. Let-

ting nonbanks issue credit cards was the camel's nose under the tent flap; now investment brokers own banks, automobile makers issue credit cards, and insurance companies sell single-payment annuities so much like certificates of deposit that only a semanticist can tell them apart. And the decreased cost of technology to support this incursion lowers the entry barrier almost to ground level. If they are to stay alive, banks have some scurrying to do.

**"Banking is a necessity;
banks are not."**

—NEAL LEVIN

The direction in which they scurry will to some extent depend on how government regulators behave in the United States and elsewhere. In the United States, banks have long been both protected and restricted by provisions of the Glass-Steagall acts of 1932 and 1933. Enacted in response to the Great Depression, the laws insure the savings of bank depositors, separate commercial from investment banking and regulate the interest that banks can pay on deposits. The repeal of some aspects of Glass-Steagall is a possible part of the future of retail banking, though "it's difficult to see movement on that issue in an election year," says Thomas Rollauer, a former bank regulator now a partner in Deloitte & Touche LLP's regulatory practice.

Glass-Steagall also prevents banks from engaging in services not directly related to banking, although government regulators have already eased that restriction somewhat, and some banks are now allowed to engage in securities sales in a limited way. If the law were totally repealed, banks could compete with insurance companies by issuing policies and with brokerage houses by underwriting and taking seats on the major exchanges. But as long as bank deposits are federally insured, legislation will limit the risks banks can take with their depositors' money. Peter Merrill, vice president of the financial institutions practice at A.T. Kearney Inc., a management consultancy in Chicago, says, "The deposit insurance fund has to be protected from business risks that banks may take. If banks were willing to give up deposit insurance, then that whole environment would change considerably."

Until they are unfettered, banks are likely to form alliances with companies that can do what they can't, sharing lobby and branch office space with stockbrokers and insurance companies so that bank customers can have their financial needs met in one place, if not by one company.

Paradoxically, the future of the retail branch bank is in question. Frank Woosley, the Dallas-based national practice director for financial services at Deloitte & Touche Consulting Group, sees half the branches in the United States, and as many as 450,000 banking jobs, disappearing over the next five to 10 years as technology furnishes new forms of banking transactions, such as Ivan's automated

I.S. ACTIONS

Warehousing and mining corporate data to identify the needs, preferences and profitability of individual customers.

Exploring emerging technologies to invent new products and services that fall within banks' regulated limitations.

Transforming business processes to eliminate paper handling as much as possible, reduce operating costs and improve responsiveness to a changing business climate.



Enhancing communications capabilities to extend worldwide reach.

Installing collaboration technology to facilitate decision making and customer service in a flatter organization.

Investigating alternatives to paper money, including electronic cash and smart-card technology.

Finding alternatives to branch banks and human contact, such as enhanced ATMs that accept loan applications and render loan decisions.

You've got questions about SAP?

SAP enterprise software is a serious investment. The more you know about it, the smarter your decision-making process becomes. But *CIO* Magazine couldn't possibly cover all its implications in just one issue. Therefore, in addition to our special focus in this issue, beginning on Page 34, we've extended the discussion in our new **CIO Interactive Article Forum** located at www.cio.com/forums/SAP.html.

Come join us **June 17 to July 3** and interact with industry experts, *CIO* writers and other CIOs who are implementing this technology. Find out lessons learned, benefits gained, hardships endured.

Participants:

- Elizabeth Baatz, senior editor, *CIO* Magazine
- Eileen Basho, VP of Professional Services, SAP America Inc.
- Bobby Cameron, senior analyst in Packaged Application Strategies, Forrester Research Inc.
- Jeremy Coote, president, SAP America Inc.
- Walter Curd, director of information technology, Fujitsu Microelectronics Inc.
- David Johns, director of global development, Owens Corning
- Chris Koch, senior writer, *CIO* Magazine
- Bill Kredel, VP and CIO, Autodesk Inc.
- Karl Newkirk, partner in charge of SAP practice, Andersen Consulting

Dates: June 17 to July 3

Be An Inner Circle Member

As an added benefit to participation in this forum, you will be enrolled in The Inner Circle. Members are automatically notified, via e-mail, of future events and forums.



THE MAGAZINE FOR INFORMATION EXECUTIVES

**We've got
answers.**

COMMON THREADS

IS executives in industries undergoing dramatic change should:

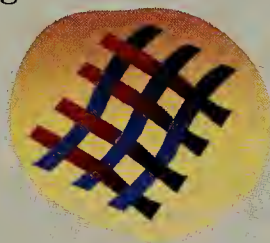
Keep on top of regulatory and legislative changes. They point the way to future opportunities and constraints.

Explore alliances with companies outside the industry, looking for those whose skills complement or augment their own.

Collaborate in planning their company's future and take the lead in demonstrating how technology can create new opportunities to head off impending problems.

Focus on the customer because consumer pow-

er rises as choices proliferate. Knowing customer requirements and preferences is crucial. CIO's should therefore build customer information systems from data collected over the years.



Lead customers gently toward the use of new technologies. Change is inevitably difficult;

customers will appreciate those who make it less so.

Cultivate flexibility as an important value. Build or buy applications that can be changed with ease and migrate processing to the lowest-cost systems possible.

loan officer, and more kinds of companies to handle them. Already some companies specialize in mortgage loans, and other banks sell credit card services as their sole product. With rising real estate prices making branch banks more expensive to operate and customers increasingly willing to use ATMs for routine bank transactions, the demise of branch banks seems ever more likely, says Neal Levin, a partner in KPMG Peat Marwick LLP, a strategic services consulting group in Chicago. "To the extent that banks can migrate their customer bases to more cost-effective distribution channels, they are going to benefit on the bottom line," he says. "Those banks that are technological leaders will prosper more than those who can't afford or don't have the foresight to invest in IT."

Much of this investment will have as its goal the elimination of paper and the employees who handle it. "Employees are the biggest single expense on any bank's operating statement," says M. Arthur Gillis, president of Computer-based Solutions Inc., a New Orleans consultancy.

Since the federal government regulates the cost of money, Gillis says, a bank has little control over the revenue line on its income statement. "The only way to affect the

bottom line is through the middle line, the cost of doing business," he says. "I've never known a bank that wasn't sold on the benefits of technology to reduce operating costs."

Investment in imaging technology is growing in popularity, Gillis says. An increasing number of banks, rather than return canceled checks to the customer, make an electronic image of the face of each check presented for payment and send those printed images, 10 to a page, along with the customer's monthly statement. "Next to the employee, the check is the most hated thing in a bank," Gillis says. Typically, banks archive images of both sides of the check and destroy the originals after a month or two.

The impact of technology on retail banking has been enormous. After two generations of dependence on huge mainframe computers, banks now have a choice of technology on which to base their businesses. Conceptually, says a report from the Deloitte & Touche Consulting Group titled "The Future of Retail Banking," there is no reason a bank can't run on a high-end Pentium PC. Communications technology has made it possible to send money in digital form across the world almost at the speed of light. No longer confined to regional activity, banks can now operate globally.

That sword cuts two ways. Bank customers can compare rates and services around the world without leaving home. The Internet is seeing to that. By a rough count, 350 U.S. banks already have presences on the World Wide Web. Most are still in the corporate identity stage, getting potential customers to feel good about them. Some, such as Wells Fargo Bank in San Francisco, allow depositors to check the status of their accounts. A few, like the Salem Five Cents Savings Bank in Salem, Mass., offer online loan applications and provide software for electronic banking.

Only a small portion of the estimated 30 million home computers in the United States are actually moving money on the Internet, but the shift seems inevitable. Colin Crook, chief technologist at Citibank in New York, predicts, "As soon as people get more comfortable about doing business over the Internet, we will see a very rapid rise." By the time today's adolescents are starting their adult lives, they will be at home in a world in which a loan officer is a computer and money is a series of zeroes and ones on a chip embedded in a plastic card. If you doubt the change can be accomplished, ask Crook. "It's been shown that a worldwide fad can be created in this [teenage] generation within 48 hours through the use of the communications infrastructure," he says. "People behave in the same way whether they are in Tokyo, Frankfurt or Los Angeles. This is astonishing."

In the same time frame, observers say, the home computer will become as ubiquitous—and as easy to use—as the telephone. Already, high-resolution monitors, lightning-fast processors and CD-ROM drives—as well as stereo speakers and the sound boards to drive them—



Sometimes, a simpler way to
do good work means having
somebody else do it.

Outsource
The
Document



Whether they're on paper or on your network,
we manage the documents so you can manage your business.

INTRODUCING THE DOCUMENT SOURCE.SM

Today, documents are strategic business assets. Look at them that way, and you'll find new ways to make your people more productive. First, you have to ask the right questions: Is your document process integrated with your information strategy? Can you manage them from creation to storage? Is it time to outsource? The Document Source is Xerox's way to help you put the right answer to work.

XEROX®, The Document Company®, and the stylized X are trademarks of XEROX CORPORATION. The Document Source is a service mark of XEROX CORPORATION. Screen shot used by permission from Microsoft Corporation. 36 USC 380.



The outsourcing decision is about partnership. Working with Xerox, you devise a document strategy that leverages your current technology investment. There's no equipment to purchase. No people to hire and manage. Now Xerox manages more than copy centers. Call 1-800-TELL-XBS, ext. 250 and learn more. Or drop in on our Web site at <http://www.xerox.com:80/XBS>.

THE DOCUMENT SOURCE PORTFOLIO OFFERS:

Documents DirectSM

Document Consulting ServicesSM

Xerox Quality ServicesSM

Document Technology CentresSM

Document Production and Mailroom ServicesSM

Special Event ServicesSM

Document Lifecycle ManagementSM

THE
DOCUMENT
COMPANY
XEROX

RETAIL BANKING INDUSTRY AT A GLANCE

PAST

Banks were intimidating institutions; bankers were expected to say "no" more often than "yes." Customers heard from the bank only in the form of a monthly statement, loan payment bill or notice of a bounced check. Most cus-



tomers yielded little profit. Branch staff had little authority except to receive deposits and cash checks. Decisions on

loan applications, made by people the customer never met, could take days or weeks.

FUTURE

Banks will struggle to balance the impersonality of online transactions with the need to maintain the loyalty of customers. Kiosks and the Internet will process loan applications in seconds. Many banks will specialize in one or two products or services. The distinctions among banks, brokerage houses and insurance companies will blur. Banks will form alliances with nonfinancial companies such as real estate agencies. Geography will become irrelevant.



have become standard issue for the home computer. Because consumers want all the bells and whistles while businesses focus on productivity, computer technology in the home often outstrips that in the office. Corporate executives are likely to log onto snappier computers in their summer homes than they do at work. All that multimedia power has to find something to do beyond turning a \$2,000 computer into a boombox. Monitoring the family's finances is one possibility to justify the expenditure.

At the same time that the capabilities of personal com-

"The alert CIO is a thinker, a planner, an executer and a businessperson looking for new ways to do things."

—M. ARTHUR GILLIS

puters have been growing, the cost of technology has been on a downward spiral, yielding enormous increases in processing power per unit of cost. According to Deloitte & Touche Consulting Group, between 1987 and 1993 the cost of processing on a PC dropped by at least a factor of 100. The cost of moving data across a network did the same, and that of storing data dropped approximately by a factor of 20. What banks need to do now would be impossible were that not the case.

What the future holds, though, is an even more radical departure—from hard cash to electronic money. Bank debit cards are already in use, deducting from the customer's account the price of a purchase at the point of sale. In San Francisco, Wells Fargo Bank is taking that technology further; a pilot project provides bank employees with a microchip-embedded wallet card on which funds can be debited and credited. The "electronic cash card" requires no authorization when the card is slid through a card reader. Banks are looking for secure ways to process payments on the Internet. Some online transactions will replace existing functionality. For example, "replacing paper with virtual checks" is a possibility, says Robert Chlebowski, Wells Fargo's senior vice president for business development in the bank's direct distribution group, "but we're also seeing an entirely different paradigm of doing business where there is great potential for growth."

CIOs are uniquely well placed to recommend technical innovations, Gillis says. "The alert CIO is a thinker, a planner, an executer and a businessperson, looking for new ways to do things for the benefit of the bank. Much of what comes out of the CIO's shop is technology that no one expected and no one asked for, but it will keep the bank alive."

When most visionaries in retail banking talk about trends in the banking industry, they eventually return to the subject of customers—getting them, keeping them and making them turn a profit for the bank. Attracting cus-

You Want A New Storage Controller To Put Mainframe Data And Open Systems Data Into The Same Box.

But If They Won't Talk To Each Other, Why Bother?

Only the revolutionary new Encore Infinity SP Family lets you configure mainframe class storage for simultaneous data sharing between mainframe, open systems, and PCs. Even better, while your different platforms can communicate at last, you control the conversation. You choose how much information is shared, how much is partitioned, who can access it, and how it's optimized for high performance, efficiency, and data protection. And if that's not enough, by using an Infinity SP storage solution you can do *all* of your system backups using the same centralized mainframe facilities you are already using. No other storage system offers you so much flexibility, with so much control of your company's information resources. Call 1-800-933-6267 to learn more about storage intelligent enough to enable all your systems to speak the same language. The first universal storage — now shipping and ready to install.



COMPUTER CORPORATION

THE FUTURE BELONGS TO A HIGHER INTELLIGENCE.

<http://www.encore.com>

tomers isn't only a matter of rates and service. "You must have your customers' trust when you're dealing with their assets," says Crook. And he maintains that trust should extend beyond the character and stability of the bank to faith in its technology, yet few banks seem to appreciate that idea's importance. "This issue of trust is something that banks have failed to develop in their competitive model," he says. When Citibank starts doing business

Technology has made it possible to send money in digital form across the world almost at the speed of light.

over the Internet, he adds, "I hope that will be a sign of confidence to people worried about security on the Internet that we can in fact achieve the level of security we feel is appropriate for customer trust. That level of security is going to come about fairly quickly."

But winning over customers is to no avail if they do not yield a profit to the bank. The marble-and-mahogany days, when gentility won out over the profit motive, are gone. For generations, banks have served people from whose business they made little or no profit, but that is beginning to change. Says Merrill, "Recently, some banks have conducted total repricing campaigns, coming up with new pricing and product packages, any one of which will make the customer who selects it at least minimally profitable."

In most banks, Merrill adds, 20 percent of the customers are producing 80 percent of the profit. The problem is, few banks know which customers are in that 20 percent category. At an application development conference in March 1996, James G. Bennett, a vice president at the First National Bank of Chicago, produced an audible stir in an audience drawn largely from the financial industry when he described the bank's multifunction client/server application. One part of the 1,600 end-user system tracks the profitability of First Chicago's customers. Bennett expects the system to serve 2,200 users by the end of 1996.

Increasingly, banks will find themselves emulating other retailers, Merrill says, marketing products and services to those most likely to purchase them. As things stand now, banks have a wealth of raw data, rather than organized information, about their customers. The CIO has the job of sharpening banks' selling skills by zooming in on individual customers' needs and preferences. That means investing in data warehousing and developing data mining applications—an expensive proposition but one ignored at the bank's peril. (See "Mastering the Possibilities," *CIO*, June 1, 1996.)

And peril it is. Woosley predicts the pace of bank mergers will jump by 50 percent in 1996. Smaller, less profitable banks will be swallowed, says Merrill. "The threat of that happening leads to a great pressure on senior bank man-

agement to make sure the bank is earning sufficient profits for its shareholders and to keep the stock price high," he says. "The higher your stock price, the less likely it is that you're going to get acquired."

As more ways of handling financial transactions come to fruition, the need for banks to exist at all comes into question. "Banking is a necessity; banks are not," says Levin. "People have to do banking, but not necessarily with a bank." Deloitte & Touche Consulting Group sees the full-service bank of today breaking up by 2010 into three specialized kinds of organizations. One will be the "product formulator," a bank that focuses almost exclusively on a single product category, exploiting economies of scale and focused expertise to win business. A second type of bank, the "customer-focused gateway," will buy

products and services from third parties and sell them to customers electronically or in what remains of the branch bank network. Finally, a service industry will spring up, pro-

VARIABLE RATES

Income soars as deposits grow and the number of retail banks shrinks

NET INCOME

(in billions)

1990	\$16.5
1993	\$43.4
1995	\$49.2 (est)

TOTAL DEPOSITS

(in billions)

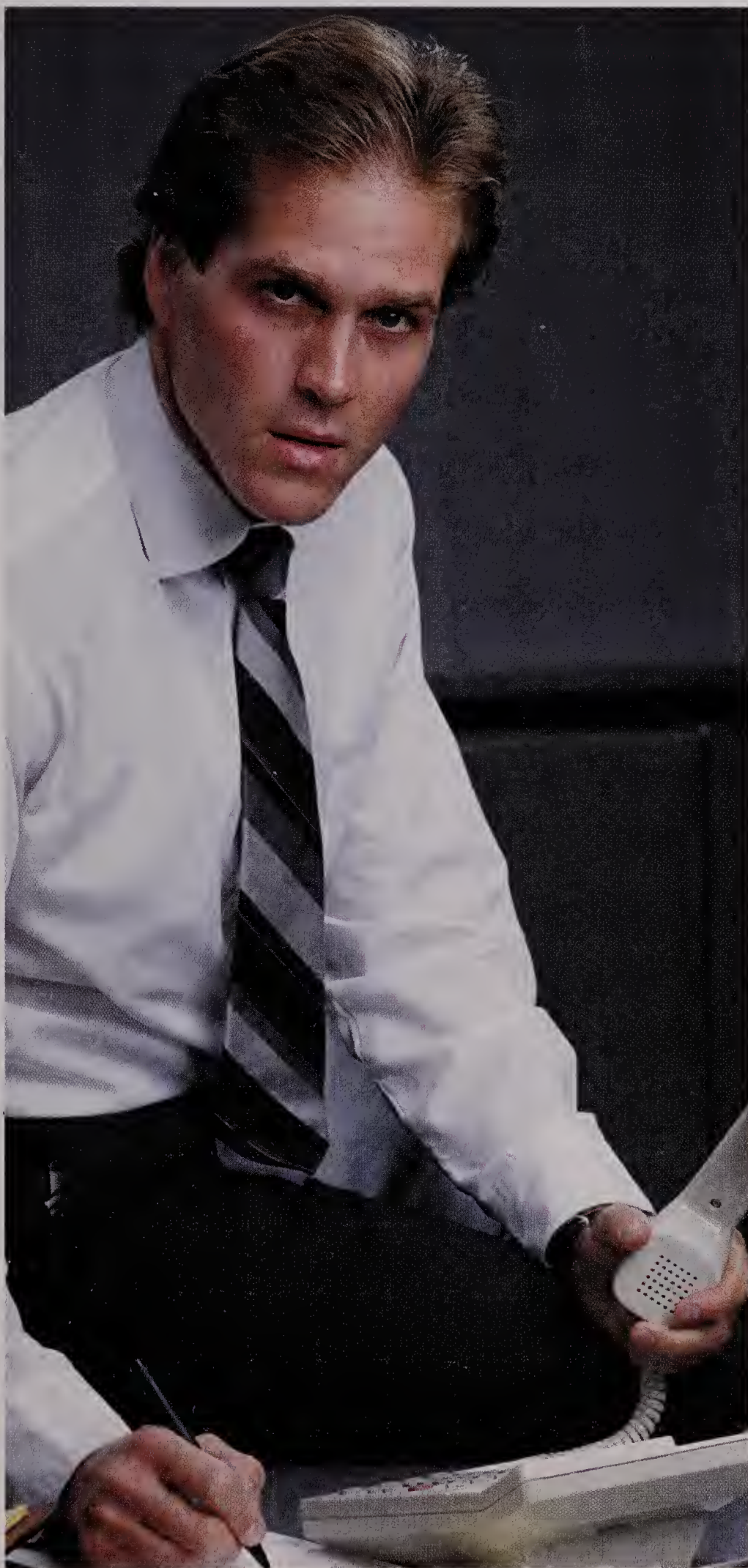
1990	\$2,647.5
1993	\$2,754.0
9/95	\$2,931.3

NUMBER OF BANKS

1990	12,323
1993	10,954
9/95	10,055

SOURCE: SHESHUNOFF INFORMATION SERVICES, INC., AUSTIN TEX.

**"I have better ways for my staff to spend their time than keeping our network up and running
... that's *NETSOLVE'S* job."**



*"I chose **NETSOLVE** to make sure our wide area network is available when we need it. They gave us a service level **GUARANTEE**, router-to-router, or my money back. It's virtually **RISK-FREE**. In fact, most months my network **AVAILABILITY** is greater than **99.9%**."*

At NetSolve, our business is wide area network design, implementation, monitoring and management. It has been for over eight years. Whether your network has 5 remote locations or 500, we'll keep it running reliably, so that you and your staff can focus on more strategic issues.

Keeping a network up and running takes experience, expertise and a strong commitment to service—a commitment that led NetSolve to pioneer the router-to-router availability guarantee. If we don't meet the guaranteed availability level in any month we refund 100% of your management fees for that month!

It's this commitment to service that caused leading companies like Standard Insurance Company, Temple-Inland Forest Products Company, and Fidelity National Title to choose NetSolve to manage their networks.

**Call us today for a
free evaluation and consultation.**



NETSOLVEsm

1-800-NETSOLVE

<http://www.netsolve.net>

A Quartet of Futures

Andersen Consulting's Allen Wolpert, managing partner for technology in the company's financial services industry practice in the Americas, offers four possible scenarios for the future of banking by 2005:

■ Hostile Neighbors

This scenario assumes that banks continue to be tightly regulated, with laws keeping profit margins low and limiting the range of products banks can offer. The edge goes to banks that minimize costs through efficiencies in application development and processing. Banks keep transaction prices down to encourage customers to do their banking electronically. "If banks compete on price alone, the atmosphere becomes extremely hostile," Wolpert says.

■ Mandatory Alliances

In this scenario, low-margin business banking becomes a commodity. Successful suppliers are huge and global. Alliances spring up between banks and other enterprises to provide a large variety of products, most of them online and using simple interfaces. For example, the bank that sells mortgages is linked to a real estate company that brings in mortgage customers and an insurance company to insure the property. Customers have less to say than banks do about what kinds of products are offered.

■ Global Specialists

Customers have most of the power in this scenario and demand to

be treated as individuals with unique needs. This gives rise to institutions that specialize in a single area, such as mortgages or investments, that may collaborate to serve specific customers and operate globally over a sophisticated electronic delivery network.

■ Friendly Conglomerates

In this scenario, the industry is dominated by comprehensive regional conglomerates focused on identifying customer needs and catering to individuals to foster customer loyalty. Margins are good, and regulation is local and not highly restrictive.

Wolpert points out that these scenarios exaggerate the various factors currently shaking out the industry.

"The actual future will be a combination of these extremes, a combination influenced by today's innovators who move now to shape the industry to their strengths," Wolpert says. Banks can look at these scenarios and decide, based largely on their views of the future of banking regulation and on the maturity of the Internet, which they deem most likely. "The next few years are going to be a time of experimentation and tremendous investment in technology."

—M. Williamson



viding banks in the first two categories with software development, predictive modeling and services such as debt collection and payment processing. Woosley says he expects the specialist banks in the first two categories to outsource much of their IT work to the third. "In the future we think there won't be a single entity that does everything. Instead, there will be more joint venturing and partnerships as organizations focus on their core competencies and rely on other organizations whose core competencies are in other areas," he says.

While all this shakes out, even those of us old enough to remember tiptoeing into a marble-columned bank

PAGES IN THE LEDGER

For more information, see these Web sites:

<http://www.corpfinet.com/Banking.html>

<http://www.qualisteam.com/aindex.html>

will learn to use our computers for all but the smallest transactions. For some, particularly old-timers whose monthly trip to the bank on pension day is a social occasion, the almost inevitable demise of the neighborhood branch bank will be a real loss for banks. The challenges and opportunities are staggering. When you take away the coins and paper, money exists only as information: How much? Where is it? Who owns it? **CIO**

Contributing Writer Mickey Williamson can be reached at mwilliamson@reporters.net

Look Into ANS For Networking Solutions

For additional information about ANS services and capabilities, please check the appropriate box(es) below and mail in this card.
For faster service, **fax to 914-789-5410.**

Introductory Materials

- ☐ General Capabilities Brochure
- ☐ Technical Overview of ANSnet

Service Descriptions

- ☐ ANS InterLockSM Service Brochure
- ☐ ANS InterLockSM White Paper
- ☐ ANS InterServSM Service Brochure
- ☐ ANS InterServSM White Paper
- ☐ ANS ResolveSM DNS Tech Brief

Tech Briefs

- ☐ Usage Reporting
- ☐ ANS InterLockSM System Tested Against SATAN
- ☐ Proactive Network Management
- ☐ Network Management Architecture

Name _____ Title _____

Company _____

Address _____

Day Phone (____) _____ E-Mail _____

CI



Fax: 914 789 5410

Tel: 800 456 8267

Visit: <http://lookinto.ans.net>



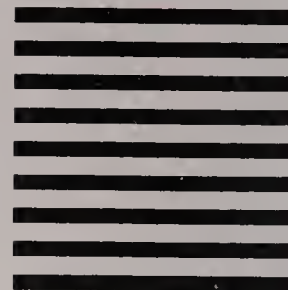
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL

PERMIT NO.04

ELMSFORD, NY



POSTAGE WILL BE PAID BY ADDRESSEE



Dept 596
100 Clearbrook Rd
Elmsford, NY 10523-9807



WHEN YOU
LOOK INTO ANS,

YOU'LL BE SURPRISED
WHO YOU FIND.



Look into ANS and you'll find a quality provider of value-added Internet and custom enterprise networking services supported by a nationwide T3 backbone—with access nodes in more than 200* cities in the U.S. and beyond. You'll find ANS people, who have the knowledge and skills to apply today's technologies to meet your business needs. And you'll discover why **Big Name** companies do business with ANS.

U.S. Robotics manufactured the 50,000 modems and remote access server technology that make ANSnet one of the largest, high-speed dial access networks in existence. It's part of the mission critical network **America Online** relies on to provide dial access to AOL's five million subscribers, and it supports more than a million sessions each day. You'll also find **GNN**, one of today's fastest growing Internet access services, whose massive server complex was designed, implemented, operated and managed by ANS.

Look further and you'll learn that ANS pioneered the use of TCP/IP technology and Internet security—just some of the reasons **Trane**, a \$3 billion global company, chose ANS to design, deploy and manage its 140-site virtual private data network.

You'll see why **Hewlett-Packard** teamed with ANS to offer Managed Intranet Solutions, which utilize Internet and Web technologies to create internal corporate information networks. You'll also discover how **Bay Networks'** high performance, high availability Backbone Concentrator Node routers are extending ANS' reputation for reliable, secure and scalable backbone network performance.

In fact, 30 of the Fortune 100 companies look to ANS for their networking solutions. ANS' 56K to T3 dedicated attachments come complete with the world's leading routers made by **Cisco Systems**. Whether it's connections, firewall security, Web hosting, VPDNs or Intranets, **ANS** has a solution that's right for your company.

Take a closer look at the people and technologies behind ANS business services. Call 1-800-456-8267, visit us at <http://lookinto.ans.net> or fill out the reply card.

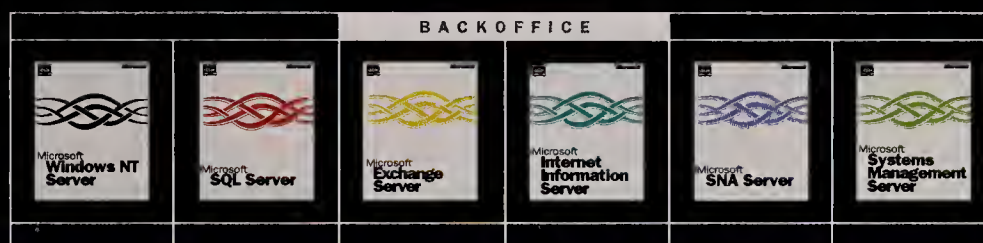
*July, 1996

Microsoft

WHERE DO YOU WANT TO GO TODAY?™



**No vendor can anticipate every
solution you'll ever need.
But one can accommodate them.**



*A family of products,
built on Windows NT
Server, designed to work
together and apart, and
with what you have.*

*The only multi-
purpose file-and-
print,application,
and communi-
cations server*

*A robust and
scalable data-
base manage-
ment system
for distributed
environments*

*The only reliable
e-mail server
with built-in
groupware
and unmatched
scalability*

*A powerful
platform for
publishing on
the Internet
and intranet*

*A truly flexible
gateway for
integrating
AS/400s and
mainframes
with LANs*

*A complete
and centralized
solution for
managing net-
worked PCs*

One day, you're relocating a department. The next, you're reengineering the entire company. Was it a merger? A reorg? Or is the CEO simply bored? No matter. With the Microsoft® BackOffice™ family of servers, you're ready for any eventuality.

With BackOffice, you're free to choose whatever solution is right for the job. IBM®, D&B, Lotus®, ORACLE®, Informix®, Intergraph®, Computer Associates, and SAP America all write applications for it. But if you'd rather write your own, you'll find working with BackOffice very easy. That's because it's written to a standard set of APIs and offers programmers their choice of development tools. And since it's compatible with every major processor, like Intel, MIPS®, Alpha™, and PowerPC™, you even have your choice of hardware, too. So while it's hard to know what solutions you'll need on any given day, it's easy to know what platform to build them on. To learn more about the Microsoft BackOffice family, call (800) 426-9400, Dept. A024. Or visit our Web site at <http://www.microsoft.com/backoffice>.

The Enemy Within

Security isn't just for companies using the Internet. Corporations must figure out how to protect themselves from the inside out.

BY ANNE KNOWLES

By now, everyone knows the wily hacker. In the past year, he has garnered more headlines than Bill Gates. He broke into Citicorp 40 times and made \$12 million in illegal transfers. He also penetrated the super-sophisticated San Diego Supercomputer Center and in the process gained access to

e-mail and credit card numbers of subscribers to The Well, a San Francisco-area Internet service provider. To be sure, he has become an archvillain to corporations everywhere.

But is he the CIO's worst nightmare? Maybe not. In fact, long before the Internet had its hackers, businesses were vulnerable to the disgruntled employee, the well-intentioned secretary, the malicious marketing manager or the bumbling boss, all of whom pose as much of a threat to corporate data as does the most determined computer con artist.

Internal hits typically do not get much publicity, but chilling stories do surface: the MCI employee who stole calling card numbers and racked up \$28 million in losses for the telecommunications giant; the temp who gave away trade secrets when British Telecom gave her an existing password—and thus granted her access to government secrets—because it was easier than creating a new one; and the Continental Airlines customer service representative who allegedly diverted more than 1.4 million frequent flyer miles to relatives and friends.

"The tendency is to look at hackers, crackers and phone phreakers," says Alan Brill, a managing director of Kroll Associates Inc., a New York-based security consultancy to Fortune 500 companies. "It is more difficult to accept the reality that real incidents are traced to real insiders."

Reliable statistics on breaches in data security are difficult to find because such incidents



are not always reported—corporations don't detect every problem, experts say, and they may sweep under the rug the slip-ups they do discover because of embarrassment.

But, says Brill, in his experience, about 90 percent of computer security problems involve someone inside the corporation; FBI estimates peg the figure at 85 percent. Computer crime has already hit nearly 95 percent of businesses, according to a survey of 200 companies conducted by Michigan State University last fall, and more than three-quarters of respondents said that it has increased dramatically in the past five years. (See the survey Web site at <http://www.ncsa.com/crimstud.html>.)

The most common crimes—those reported by more than 90 percent of respondents—include unlawful copying of copyright or licensed software; credit card, telecommunications and cellular phone fraud; unauthorized access to computer files; and employee use of company computer equipment for personal reasons. Most of those crimes involved employees or contract workers, says criminal justice professor David Carter, who conducted the survey.

But not all transgressors cause harm intentionally. Well over half the damage done can be traced to innocent errors and omissions on the part of employees, says Mich Kabay, director of education at the National Computer Security Association (NCSA) based in Carlisle, Pa., a consortium with more than 30,000 corporate and individual

members. "People are not typically malicious," he says. "Rather, they are untrained, unaware or careless."

Despite the publicity surrounding security and the Internet, some companies remain unaware of the dangers they face. For the sake of convenience, managers give temporary personnel the passwords of the people they replace. Or companies check visitors only when they exit a building, when what people bring in—computer viruses, for example—can cause more damage than would the loss of something they might steal.

"Many organizations are in a reactionary mode," says Richard Kosinski, president of Internet Security Corp. in Lexington, Mass. "They install security solutions to address individual problems only after they arise." Firewalls, for example, are created to secure an Internet gateway; eventually, the company may look into authentication for remote users, which leads to encryption, restriction of Web access or virus protection. "It's incumbent upon the CIO to take a step back and determine what the enterprise security policy will be when deploying these new applications," Kosinski says. Otherwise, an assortment of nonintegrated products may leave a door ajar to be exploited by either internal or external entities.

Corporations should begin by providing users with a clear set of procedures to follow. "The Internet and intranets have changed the

**"THE TENDENCY IS TO
LOOK AT HACKERS,
CRACKERS AND PHONE
PHREAKERS. IT IS
MORE DIFFICULT TO
ACCEPT THE REALITY
THAT REAL INCIDENTS
ARE TRACED TO REAL
INSIDERS."**

—Alan Brill



ILLUSTRATIONS BY TRAVIS FOSTER

"I SEE A GENERAL LACK OF CONCERN OVER SECURITY POLICY. IT IS NOT ASSIGNED A HIGH PRIORITY, AND THE PEOPLE RESPONSIBLE FOR IT DON'T HAVE ENOUGH CLOUT."

—Mich Kabay

security landscape, and many organizations are now trying to play catch-up," says Kosinski. "Policies written even one or two years ago addressed the connectivity requirements of closed, proprietary networks."

Policies should cover such areas as proper use of passwords, guidelines for administering access to the system, antivirus procedures and provisions for auditing backups.

Martin Yanover, vice president and CIO of Sweetheart Cup Co., hired a consultant to audit the security infrastructure at the Owings Mills, Md., manufacturer and supplier of food service products and then drafted a security policy and procedures manual. One version of Sweetheart's security manual has been created for business users and a more technical version fashioned to describe the IS department's implementation responsibilities. Each manual is 25 pages or less and addresses log-in security, systems design and control, software control, physical security and viruses.

"Brevity, however, is key," says Yanover. "Our handbook doesn't take more than a few minutes to read. And if you write it clearly, then ignorance won't be an excuse."

What's more, Sweetheart's IS department doesn't "own" the security or disaster recovery plan; instead, the business unit heads are responsible for making it work. "Once the policy and procedures manual is written," says Yanover, "the various lines of business should become accountable for it." Yanover and his staff explained the policies and procedures outlined in the document in a meeting with the company president and managers so that they, in turn, could train their staffs. "A concisely written manual can go a long way toward making employees aware of the dos and don'ts of corporate information and computer resources," Yanover says. "Then the company's security policies should be revisited on a regular basis."

Oil giant Mobil Corp. has four pages of policies and procedures covering virus checking, the use of sanctioned software and other end-user concerns. In addition to distributing the pamphlet in hard copy, it is also available on

the company's internal World Wide Web server, says Bill Fessler, former manager of telecommunications and host computing technology planning in Fairfax, Va.

Making policies and procedures widely available also helps. One of the most common mistakes companies make about security, say

experts, is limiting lists of "insiders" to full- and part-time employees. When developing security policies and procedures, corporations must also disseminate them to temporary personnel, consultants, contractors, business partners and vendors, all of whom have some access to corporate data.

In addition to distributing an employee manual, companies may need to conduct ongoing awareness programs through newsletters and annual reviews to keep employees informed of new security threats and their potential impact on the company. "An in-house training and awareness program can explain the benefits of protecting corporate assets," says Garnett Williams, managing director of Kroll Associates' Santa Clara, Calif., office. "Employees must recognize their part in the security effort, or the company won't survive."

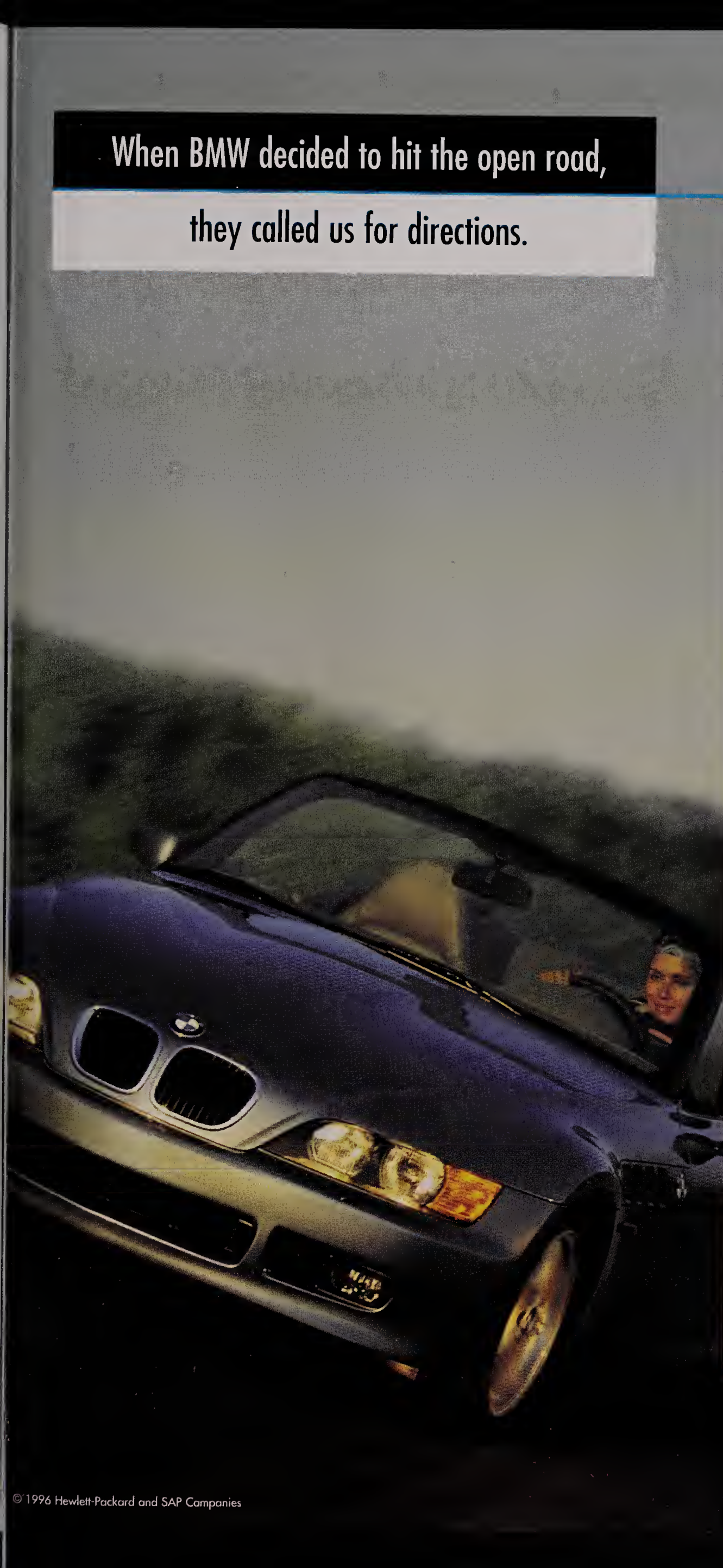
Companies should follow effective procedures when an employee leaves as well. Brill says he had a client company whose security directors thought they had an effective policy in place for departing employees: Accounts inactive for 90 days were automatically cut off. But one employee used the company's resources for two years after he left by dialing in remotely. His account was never canceled because he kept using it.

For many, remote access is a major security issue. By 2000, about 35 percent of the workforce will be made up of employees dialing in from remote locations, according to Don Ulsch, senior vice president of the Online Research Group of O'Reilly & Associates Inc. in Sebastopol, Calif., and an advisory board member of the National Security Institute in Westboro, Mass. Ulsch says telephone lines to computers can be a major source of damage and disruption to the networks that connect remote terminals and computers. An automatic dial-back system is one technique that can help close a major opening to crime and misuse. But such controls identify the hardware, not the user, and can still leave companies vulnerable to unauthorized use.

Making remote access secure involves a set of complex technologies, says Marc Fastiggi, vice president of technology at Securix Inc., a supplier of Boks access control and security management software in Burlingame, Calif. "You should have some encryption software on the client, the server and the network because you can't always guarantee the origins of access," says Fastiggi.

Bankers Trust Co. in New York has found a





When BMW decided to hit the open road,
they called us for directions.

Thoroughness and attention to detail are obsessions at BMW. So it's no surprise that they evaluated over 130 applications and all the major hardware providers when choosing information technology for their new manufacturing facility in South Carolina. The winners? Hewlett-Packard and SAP. Our team not only delivered a total, integrated client/server solution based on open systems — we got the system up and running in just four months, which is fully consistent with another BMW obsession: high performance.

For more information on how we can help put your company on the open road to success, call 1-800-275-7057 or cruise our homepages at <http://www.hp.com/go/hp&sap> and <http://www.sap.com>.



SAP AWARD OF EXCELLENCE
1995



Security Tips

If you think the greatest threat to information security comes from the outside—competitors, hackers or viruses—think again. Those external threats will only distract you from the dangers you face from inside your own organization.

Here are some suggestions as you think about your company's security:

- Consider hiring an external auditor to assess your company's security infrastructure. Seek out advice from a CIO whose company has been affected by a security breach. Include a human resources representative in the design and implementation of a plan.

- Create a thorough, concise security policy that covers employee access, authorization and responsibility. Be sure to consider temporary personnel, consultants, contractors and customers when

drawing up your policy.

- Have upper management sign off on the policy and make the heads of each line of business responsible for its enforcement. Prepare a list of additional reading on information security for senior management. They will be more likely to support your efforts if they are well informed.

- Distribute the policy and procedures to every employee. Conduct ongoing employee security awareness programs through newsletters, training sessions and annual reviews. Sponsor security aware-

ness seminars and surveys. Create imaginative slogans, posters, newsletters and training programs.

- Maintain a record of everyone who logs on and off the system. Don't just identify authorized users of the network; also identify unauthorized attempts to log on—even if they're unsuccessful. When something goes wrong, an audit record can be a valuable clue to what happened.

- Be sure to remove access and authorization for all departing employees and remind them of their obligations to refrain from using your confidential information.

satisfactory solution to its remote-access worries by using smart cards, which generate new passwords for remote-user log-in. The use of a smart-card password coordinated on a back-end server verifies user identity. "The key to remote access is strong authentication," says Jeff Misrahi, vice president and technology security officer at Bankers Trust. "The solution for us costs about \$45 per card and a few thousand dollars for each server," he says.

Encryption technology is also widely available in commercial products, such as Northern Telecom Ltd.'s Entrust, or via "freeware"—software that can be downloaded without cost over the Internet. For the most part, however, "freeware is worth exactly what you pay for it," says Kosinski. "I'd rather not implement security systems using software for which the source code is available to any 12-year-old who thinks being a hacker is fun."

In addition, the U.S. government still restricts exportation of encryption technology using keys longer than 40 bits because it cannot easily break codes of that size, and it doesn't want U.S. companies selling stronger encryption technology abroad that

could be used for espionage. (IBM Corp. gave the U.S. government the key to Lotus Notes so it could export versions of the workgroup software with stronger encryption. But according to Notes developer Ray Ozzie, who opposes

such key-escrow schemes, the deal is only a short-term solution.)

Netscape Communications Corp., Microsoft Corp. and others are in a battle over competing standards schemes for Internet encryption. Microsoft is developing cryptographic application programming interfaces through which third-party applications can perform encryption provided by the Windows operating environment and Windows NT operating system. Intel Corp. is reportedly adding encryption functionality to its chips through dynamic link libraries called Common Security Services Manager. "We really need to see which encryption scheme becomes standard and when it will be embedded in servers and clients," says Ted Julian, an analyst with International Data Corp. in Framingham, Mass. "That will determine who wins and loses."

Few projects succeed without approval and commitment from top managers, and security planning is no exception. "In the audits I do, I see a general lack of concern over security policy," says NCSA's Kabay. "It is not assigned a high priority, and the people responsible for it don't have enough clout." But outlining threats and the benefits of a good security program can help sell security planning to upper management.

Start with a presentation that discusses where the company's information is vulnerable to theft, loss or damage; be sure to spell out the impact of losing that information as well as actions that can be taken to reduce the dangers. "Your proposal should identify the



Networking CDs Has Never Been Easier...

On-line, simultaneous access to
data on from 7 to 256 CD-ROMs

Hot-swappable components
assure non-stop operation

Over 300 trained network
engineers provide on-site service

Support for popular network
operating systems and protocols
including IPX/SPX, TCP/IP and Netbeui



Plug-and-play installation
for direct attachment to your
network with no downtime

Sophisticated software
makes it simple to secure
and monitor your network

Custom built to meet
your specifications

Ethernet, Fast Ethernet, Token Ring,
FDDI, CDDI and ATM connectivity



The world's most respected
computer publications agree.

Procom Technology's CD-ROM Servers and Arrays are the simplest and most dependable way to network up to 256 of the fastest quad or six speed CD-ROM drives.

End users agree too! Our customizable CD Servers and Arrays are the standard for the most prominent names in government, banking, law, entertainment, healthcare, education, accounting and document imaging.

Whether you run NetWare, OS/2, UNIX,

The Broadest Line of CD-ROM Network Solutions, From the World Leader in CD Servers & Arrays

Windows NT or AppleTalk you get a complete plug-and-play solution that has you up and running in minutes. And, our subsystems are easy to integrate and expand as your needs grow.

Procom Technology CD-ROM networking solutions seamlessly integrate high-performance hardware with feature-rich, easy-to-use software for sophisticated CD-ROM

**For More Information, Call
(800) 800-8600 ext. 414**

storage management. Each Procom Technology CD Server or Array is

backed with an unmatched service program that includes toll-free technical support from CD networking specialists. You can also add the additional convenience of On-Site installation and repair.

So, when you need a simple, powerful CD-ROM solution that's guaranteed to work on any network—contact Procom Technology.

We'll have you up and running in no time.



Phone: (800) 800-8600 or (714) 852-1000 ext. 414
Fax: (714) 261-7380
2181 Dupont Drive, Irvine, CA 92715
<http://www.procom.com>
E Mail: info@procom.com



Foreign Policy

Five Mistakes CIOs make in generating security policies and procedures:

1. Failure to understand what needs protecting
2. Failure to thoroughly comprehend technologies
3. Failure to determine the value of corporate information
4. Failure to get senior management approval
5. Failure to initiate a continuing security program

SOURCE: INTERNET SECURITY CORP.

most important information risks, a plan of action, a timetable and any additional actions, such as publishing new policies, that will be necessary," says Kimberly Lorencic, senior analyst at the Yankee Group in Boston. "Include senior management, network administrators and various department supervisors to be sure that everyone has a voice in the plan," she says.

"If anything, we need to keep promoting the idea of security," says Yanover. "Board members, CFOs and many others can be naive about security. The president and the lines of businesses must agree on an enforceable policy, and then the presi-

dent should sign off on it."

But once managers buy into the need for security, they might not be too pleased with what it will cost.

"Executives are always interested in specific, bottom-line results," says Lorencic. "Because your budget is limited, it makes sense to concentrate your effort on the threats that are most serious to your organization."

Even at banks, where security has always been given high priority, cost is an issue. "The idea of having security is seen as critical," says Misrahi. "But how you implement it may be a challenge primarily because of the cost."

Traditionally, security expenditures are justified based on a risk or cost-benefit analysis, in which the cost of having data pilfered or destroyed is weighed against the cost of protecting it. Sweetheart Cup's Yanover included security among estimates for a revamped disaster recovery plan, which he says was easy to sell to the company's president. "It's like insurance; the cost, relative to risk, was low," says Yanover. "With \$100,000 in business resumption, disaster recovery and security software costs, we are protecting about \$25 million in hardware and software. We had no difficulty selling that."

But Kabay says such annualized risk assessments can be misleading. "You can't necessarily multiply the likelihood of an event by its cost," says Kabay, because predictions are unreliable. Instead, Kabay suggests that far greater attention be paid to practical issues, such as how much the information is worth on the open market.

"Ideally, the CIO should provide the expertise on what information exists and where it

resides," says Kosinski, "and management should help quantify the value of the information and determine the potential costs of that information becoming lost, damaged, or made public."

Another question to ask is, "What is a company's liability if the information is breached?" Businesses such as hospitals, which store confidential patient information, may have some legal risks if sensitive information is stolen, says O'Reilly & Associates' Ulsch.

In court, a company's security policy and procedures can be scrutinized to determine the company's liability, says Paul Foldes, a business law attorney and consultant in Alexandria, Va. The accountability stems from "duty of care," a concept in product liability law that applies to computer records as well as defective toys and requires a company to prove that it took necessary and adequate precautions.

According to Foldes, few case precedents exist when it comes to computer crime and liability because the technology is moving faster than the regulations. Also, many corporations ask to have records sealed. In the final analysis, though, the level of security required to absolve a corporation of liability depends on the context of the crime. The question in each case becomes whether the people involved took reasonable precautions (i.e., could they foresee potential problems?), "and that issue is open to interpretation," says Foldes.

The presumption is that if a network is left unguarded, the company may be liable, says Joel Maloff, principal of The Maloff Co. in Dexter, Mich., an Internet business consulting firm. What's more, he says, the courts have found that companies whose confidential documents are purloined may not have legal recourse if those documents were not adequately protected in the first place. So the quality and effectiveness of a security plan could be the best defense, both in the courtroom and inside the corporation.

"Developing an enterprise network security policy is really about placing values on intangibles—an organization's information assets," says Kosinski. "The process involves cataloging information assets, giving those assets a relative valuation, deciding who should have access to them and then, finally, selecting technologies that provide the appropriate levels of protection." 

Anne Knowles is a freelance writer based in Brookline, Mass. She can be reached via e-mail at anne@knowles.com.



Did you know that one of the top names in systems support also provides systems integration?

Go-Configure

Maintech offers the technical expertise to design, configure, install and support your network environment.

25 years has taught us, you can't separate the system from the network. Maintech's understanding of system design evolution from mainframe through mini to desktop provides us with a unique perspective on business computing services.

Our clients rely on us for project management, LAN/WAN design, product implementation, asset management and support services. Whether you are running UNIX®, Windows NT or Novell™, Maintech will help you determine the most appropriate, cost effective solution for your integration and support needs.

Experience—We've supported high performance applications since 1971.

Resources—We're backed by the billion dollar strength of Volt Information Sciences, Inc.

References—Check the Fortune 500.

So who's the one to call when your multi-vendor, multi-technology environment doesn't configure?

MAINTECH

A DIVISION OF VOLT DELTA RESOURCES, INC.

Systems Support End to End

1 800 426-TECH

"LADIES AND GENTLEMEN, DOCUMENT



Information speeds around so fast these days, it's hard to imagine it won't take a wrong turn. Let's face it...creating, managing and sharing business information is not easy. Particularly when you're coping with numerous documents, spreadsheets, electronic files, email, drawings, Internet downloads, and Intranet overload. But there is a simple solution.

Interleaf's Integrated Document Applications. Designed to meet business needs, not just technical checklists.

WHAT'S YOUR DOCUMENT MANAGEMENT PROBLEM? Most managers don't think they have a document management problem. All they know is that they deal with thousands of pages of information from hundreds of people using different software on varied platforms. They never know if the correct version is available across the enterprise, at customer sites or in their field offices.

Only Interleaf, the market leader in Integrated Document Applications, manages the convergence of Document Management, Electronic Publishing, and Internet distribution. The result? Our customers dramatically reduce the time and cost of reliably distributing business-critical information throughout the enterprise.

I'M AFRAID WE HAVE A MANAGEMENT PROBLEM."



Interleaf has the experience to meet the needs of industries that include manufacturing, pharmaceutical, telecommunications, financial services, professional services and government. Our solutions provide access to critical information, for such applications as product specifications, regulated safety data, financial compliance, and quality processes.

RESULTS YOU CAN DRIVE TO THE BANK. Many Interleaf customers achieve bottom line results that exceed 100% ROI in less than one year. What can we do for *your* business?

CALL 800.456.5323 AND ASK FOR EXT. 111 FOR A VALUABLE ROI STUDY FROM IDC. Call today for your free copy of International Data Corporation's study – *The Business Case for Electronic Document Management*.

Interleaf

You'll see concrete examples that show how Interleaf solutions help companies drive higher productivity and lower costs.

DOCUMENT APPLICATIONS FOR REAL BUSINESS PROBLEMS.



Six Months in Review

An index of all major articles published in *CIO* in the first six months of 1996, including a cross-reference by article type

DECEMBER 15, 1995/ JANUARY 1, 1996

Special Issue: IT in the Next Millennium

1058. "Introduction: What Will the Future Hold?" (Page 36)—in this special year-end issue, we explore IT and business trends in the next millennium.

1059. "The Yellow Brick Road" (Page 38)—we may not know what lies at the end of this path we're on, but one thing's for sure—this definitely isn't Kansas anymore. By Lynda Radosevich

1060. "The Adventures of Orrin Fancher, New Age CIO" (Page 54)—meet fictitious future CIO Orrin Fancher. By Lew McCreary

1061. "Going the Distance" (Page 62)—technology pioneers experiment with faster, cheaper

ways to deliver data, text, graphics, sound and video. By Anne Stuart

1062. "Communications: Anywhere, Anytime, Any Medium, Any Day Now" (Page 72)—leading technology developers explain what they're working on and describe what kind of world these products might help shape.

1063. "Into the Futures" (Page 26)—traditional strategic planning is fine for a stable, predictable world. So what do we do now? An Insights column by Susan Grandpierre

1064. "The Future of Knowledge Management" (Page 30)—effective knowledge management will hinge on people, not technology. A Think Tank column by Tom Davenport

1065. "New Year's Evil" (Page 82)—with a virtual time bomb ticking away in mainframes every



where, the year 2000 poses some serious threats. A State of the Art column by John Edwards

1066. "Future Shtick" (Page 96)—find out what your customers and competitors will be doing in the year 3000 and beyond. A CIO Light column by Ezra Poundcake

JANUARY 15, 1996

Special Focus: IT Purchasing

1067. "Acquiring Minds" (Page 30)—a roundtable of IS and procurement experts looks at the changing environment for IT purchasing and its effect on the CIO role. By Mickey Williamson

1068. "CIO's 1995 Reader's Choice Awards" (Page 42)—what are you buying? Our research group surveyed readers and came up with a list of leading technology vendors and products.

1069. "Making Brain Waves" (Page 22)—after a decade of frustrated hopes and disappointments in the corporate arena, artificial intelligence is on the way up again, thanks to the increasing success of neural networks. By E.B. Baatz

1070. "Great Expectations" (Page 46)—SWIFT's customers want flawless service, but in their capacity as owners, they also have an eye on the bottom line. A European Spotlight feature by Richard Pastore

1071. "When Doing Equals Learning" (Page 52)—organizations look for ways to erase the line between training and work. A State of the Art column on electronic performance support systems by Tracy Mayor

1072. "Their Methods Aren't Madness" (Page 72)—CIO-turned-consultant W.F. Dyle explained in a recent "CIO Confidential" column why he had little use for consulting methodologies. His new colleagues beg to differ.

JANUARY/FEBRUARY 1996 WebMaster

WM20. "Looking for a Few Good Apps" (Page 30)—Banc One is testing its assumptions about electronic commerce with a series of highly focused pilots. By Leigh Buchanan

CATEGORICALLY SPEAKING

Articles are numbered in sequence from the first issue of *CIO*. (See previous December issues for guides to stories published prior to January 1996.) To find articles of interest, refer to the category listings below. For example, readers interested in online strategies would look up 1059 and WM20. An online index of articles, dating back to January 1993, is available on the World Wide Web at <http://www.cio.com/CIO/>. To subscribe to WebMaster, now a stand-alone publication, visit <http://www.web-master.com>.

Business/Management Issues 1059, 1063, 1067, 1072, WM22, 1080, 1086, 2000, 2003, 2004, 2005, 2010, 2011, 2018, 2021, 2025, 2026, 2027, WM31, WM32, 2034, 2042, 2045, 2049

The CIO Role 1060, 1083, 1084, 1098, 2019, 2030, 2039, 2049

Client/Server-Open Systems 1079, 2015, 2017, 2024, 2033, 2041

Communications Technology/Networking 1061, 1062, 1070, WM20, 1090, 2002

Databases/Data Warehouse WM30, 2008, 2009, 2035

Downsizing/Outsourcing 2025, 2026, 2027, 2028, 2034

End-User/Customer Relations 1071, WM23, WM24, 1078, 1093, WM27, WM29, 2012, WM34, 2044

Enterprise Value/Return on Investment 1074, 1075, 1076, 1077, 1078, 1079, 1082, 1087, 2002, 2007, 2010, 2011, 2015, 2017, 2024, 2029, 2033, 2041, 2048

Global Issues 1070, 1097, WM21, 2003

Industry Overviews 1085, 2020, 2044

Information Management 1064, 1086, 1097, 2006, 2014, 2022, 2034, 2038

IS Strategies 1059, 1061, 1067, 1074, 1075, 1076, 1077, 1078, 1079, 1091, 1093, 1097, 2003, 2005, 2010, 2011, 2012, 2013, 2018, 2021, 2031, 2035, 2037, 2042, 2043, 2045, 2047

Online Technology/Strategy 1059, WM20, WM21, WM22, WM23, WM24, WM25, 1080, 1091, 1098, WM26,

WM27, WM28, WM29, WM30, 2020, WM31, WM32, WM33, WM34, WM35, 2039, 2040

Organizational/Human-Resources Issues 1083, 1084, 1094, 1096, 2019, WM35, 2034

Reengineering 1099, 2005, 2021, 2036

Technology Overviews 1065, 1069, 1071, WM25, 1081, 1088, 1090, 1091, 1095, 2001, 2008, 2016, 2023, 2032, 2040

Finally, An IT Standards Study That
Will **IMPROVE** Your Ability
To **CUT** Costs,
BOOST Productivity, and

ENHANCE Communications
Within Your Organization

Improve your effectiveness as an IT executive. Whether you want to amend your current process for managing IT standards or need to establish new practices, this landmark study, *Trends and Practices in Managing Information Technology Standards*, will enable you to intelligently evaluate your options.

Order before June 30, 1996 and you will receive the *Trends and Practices in Managing Information Technology Standards* study for a special charter price of \$795. That's a savings of \$500 off the regular price. Please mail the order form to CIO Communications, Inc. 492 Old Connecticut Path, Framingham, MA 01701 or fax to (508) 872-0618 or call Diane Martin at (508) 935-4274.



CIO COMMUNICATIONS, INC.

CIO Communications, Inc
492 Old Connecticut Path • Framingham, MA 01701
(508)872-0080 • <http://www.cio.com>

An IDG Company

**THE TRENDS AND PRACTICES IN MANAGING INFORMATION
TECHNOLOGY STANDARDS STUDY EVALUATES...**

- Management trends including communications, frequency, organizational responsibility, and end user involvement
- Leading practice usage and effectiveness including pricing strategies, committee experiences, and enforcement methods
- The scope and effectiveness of setting standards for a variety of technology categories

☐ I'd like to take advantage of the special charter offer. Please send me the *Trends and Practices in Managing Information Technology Standards* study.

Please mail this order form to CIO Communications, Inc., 492 Old Connecticut Path, Framingham, MA 01701 or fax to (508) 872-0618.

☐ Please bill me. P.O.# _____

☐ I've enclosed a check for \$795.

☐ Please charge my credit card.

CARD _____

No. _____

EXP. DATE _____

Trends and Practices in Managing Information Technology Standards

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

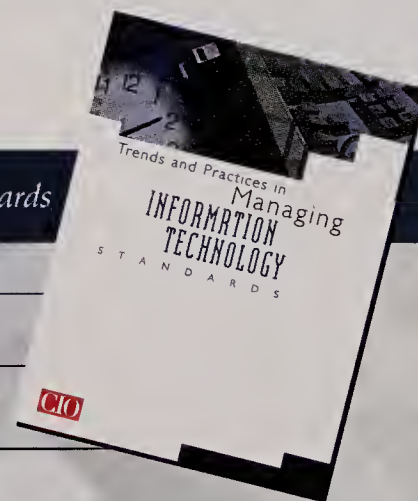
STATE _____

ZIP _____

TELEPHONE NO. _____

FAX. No. _____

EMAIL _____



WM21. "Foreign Entanglements" (Page 38)—companies serious about using the Internet to rustle up international business will have to deal with some sticky issues. By Fred Hapgood

WM22. "Hostile Exchanges" (Page 44)—when a Web startup runs up against one of the world's largest stock exchanges, questions of information ownership and the vulnerability of established power structures come into play. By E.B. Baatz

WM23. "So Many Toys, So Little Time" (Page 22)—these days you can dress up your Web site with every capability short of scratch-and-sniff. The question is: should you? A Customer Interface column by Jim Sterne

WM24. "Proving Grounds" (Page 26)—you've got hordes of new customers and suppliers clamoring to do business with you over the Net. But are they who they say they are? A Work in Progress column by Fred Hapgood

WM25. "A Linking Person's Guide" (Page 56)—why do all the lessons we've already learned about hypertext fly out the window when it comes to the Web? A Master Keys column by Howard Strauss

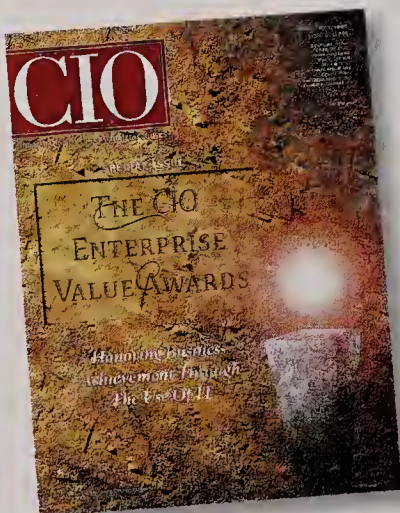
FEBRUARY 1, 1996

Special Issue: The Enterprise Value Awards

1073. "Mining for Gold" (Page 24)—this year's EVA winners have extracted real value from challenging conditions. By Abbie Lundberg

1074. "Birds on a Wire" (Page 28)—by putting product information online, McDonnell Douglas Helicopter Systems helps its salespeople close deals on the fly. By Megan Santosus

1075. "A Speedy Recovery" (Page 34)—Brigham & Women's Hospital's computer medical order



entry system warns staff before problems happen. By Peter Fabris

1076. "Power Launch" (Page 38)—a new document storage system at Rockwell International shaved weeks off space shuttle schedules and saved the company an astronomical sum. By Carol Hildebrand

1077. "A Bargain at 15 Cents" (Page 42)—United HealthCare deployed artificial intelligence and cut the cost of each claim review to three nickels. By Anne Knowles

1078. "Full-Service Stations" (Page 46)—customers get their fill of help from Gensym Corp.'s innovative support system. By Carol Hildebrand

1079. "Orders of Magnitude" (Page 52)—thanks to its new enterprise information system, Telogy Inc. has slashed order fulfillment from 11 days to three while accommodating tremendous growth. By Peter Fabris

1080. "Seven Syllables of Salience" (Page 20)—today more than ever, IT has the potential to cut out the middleman. A Think Tank column on disintermediation by Tom Davenport

1081. "Endless Possibilities" (Page 56)—tools that simulate what-if scenarios show managers that a picture is worth a thousand words. A State of the Art column by Daniel Gross

1082. "Found Money" (Page 64)—a client/server-based planning system lets Arizona Public Service recover millions in lost revenues. A Working Smart column by Jennifer Bresnahan

FEBRUARY 15, 1996

Special Section: Executive Compensation and Evaluation

1083. "Full Market Value" (Page 28)—the highest-paid IS executives have the word "chief" in their titles, work for large companies and are willing to move, according to CIO's first executive compensation survey. By E.B. Baatz

1084. "Sitting in the Hot Seat" (Page 40)—the standards by which CIOs are judged are rapidly shifting—and getting tougher. By Christopher Koch

1085. "Working on the Railroad" (Page 48)—compelled to elevate their customer service standards



and reshape their competitive positions, railroads are investing in corporate and industrywide IT. By Megan Santosus

1086. "Privacy Versus Profit" (Page 56)—who should own information? An interview with communications and computer lawyer Anne Wells Branscomb. By Carol Hildebrand

1087. "Saving Grace" (Page 22)—Gartner Group presents 16 ways to save money on IT expenditures. A Gartner View column by Jerry Cooperman and Ken McGee

1088. "Mightier Mites" (Page 62)—handheld computers are becoming the more functional tool of choice for mobile workers. A State of the Art column by Dennis Livingston

MARCH 1, 1996

Special Issue: Groupware

1089. "All Together Now" (Page 28)—collaborative computing exists in cyberspace, in the corporate infrastructure, in any of a thousand groupware utilities and, essentially, in the company's culture. By Carol Hildebrand

1090. "Getting a Grip on Groupware" (Page 32)—tools that enable groups to nullify the bound-



aries of time and geography are fast becoming a hot commodity. By Mickey Williamson

1091. "Open to Debate" (Page 42)—though the differences between Notes and the Web are diminishing, each still has distinct advantages. Business needs should determine whether you choose one or the other—or both. By Alice Dragon

1092. "Taking Notes to the Next Level" (Page 54)—deploying Lotus's groupware to the enterprise requires software, programmers, cash and support from upper management. And the burden of proof falls squarely on IS's shoulders. By Tracy Mayor

1093. "A Little of That Human Touch" (Page 64)—corporate collaboration requires discovering and managing the behavioral and organizational factors that drive and derail many groupware efforts. By Carol Hildebrand

1094. "Software as Socialware" (Page 24)—if software is to be successful, we must pay attention to the social and behavioral changes it engenders. A Think Tank column by Tom Davenport

1095. "Notable Additions" (Page 74)—the market for third-party tools has grown enormously in the last three years, creating a wealth of add-on products for Notes developers and administrators. A State of the Art column by Sally Blanning DeJean

1096. "The Lone Ranger" (Page 88)—to hell with working together! If it can't be done without the interference of others, it probably isn't worth doing at all. A CIO Light column by Ezra Poundcake

MARCH 15, 1996

1097. "Tapping New Markets" (Page 34)—a successful blend of IT consolidation and vision has helped Interbrew become a global competitor and the fourth-largest brewer in the world. A European Spotlight feature by Richard Pastore

1098. "Sky Pilots" (Page 42)—IS executives have lots of reasons for delaying the takeoff into the Internet. But advance-guard CIOs who are already navigating cyberspace warn that the countdown has begun. By E.B. Baatz

1099. "To Market, To Market" (Page 48)—no matter what your company's marketing approach, the

Get the competitive edge!

Subscribe today and



SAVE \$23

YES, please enter my one-year subscription (21 issues) to CIO magazine and bill me later for only \$75, a savings of \$23 off the basic rate.

NAME

TITLE

COMPANY NAME

ADDRESS

CITY STATE ZIP AS96

The basic one-year subscription rate for CIO magazine is \$98. This is a domestic rate only (US and Canada). The foreign rate is \$110 prepaid in U.S. Currency.

New Subscriber



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL

PERMIT NO 1020

FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE



Attn: Circulation Department
PO Box 9208
Framingham, MA 01701-9486



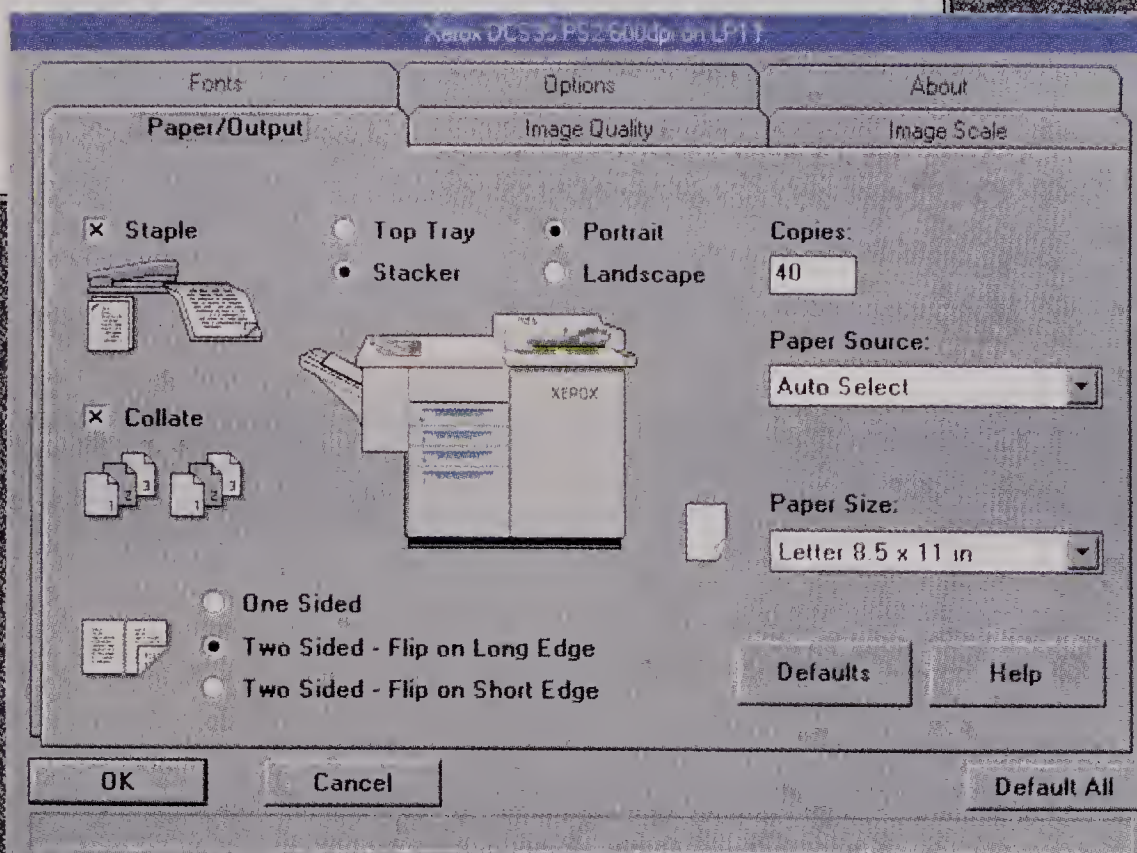


THE
DOCUMENT
COMPANY
XEROX
Worldwide Sponsor

See what it feels like
to print, fax, copy,
distribute, staple
and collate without
leaving your desk.

Network
The
Document

The Xerox Document Centres are a new class of digital document systems that deliver a full range of intelligent document services. They expand the capability of the network and close the gap between electronic and paper documents. Which means you leverage your digital investment, and give anyone on the network a faster, better way to work.



XEROX®, The Document Company®, Document Centre, CentreWare Software and the stylized X are trademarks of XEROX CORPORATION. Other products mentioned herein are trademarks of their respective owners. 36 USC 380.



Document Centres give office workgroups new ways to get more done. From walk-up digital copying, to printing, faxing, and finishing documents directly from your PC, they work the way you want to work.

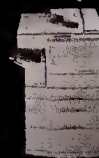
The Numbers Talk. Speed: 20 or 35 ppm. Resolution: 400 x 400 dpi or 600 x 2400 dpi. Duty cycle: up to 75,000 to 200,000 pages. Document Centres support Novell NetWare



and TCP/IP protocols.

CentreWare Software gives every user a simple, intuitive interface. This point and click desktop control removes steps, and footsteps, from the work process. And it gives systems administrators the ability to monitor document functions and printing activity across a network.

Call 1-800-ASK-XEROX, ext 251. Or visit <http://www.xerox.com>.



THE
DOCUMENT
COMPANY
XEROX

underlying concept is the same: It's got to be fast, flexible and inexpensive. By Rosemary Cafasso

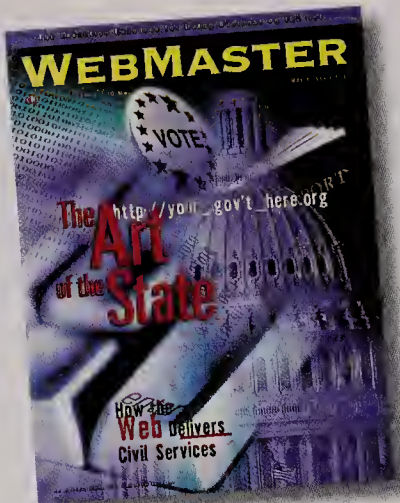
2000. "The Bright Stuff" (Page 56)—according to Harvard psychologist Howard Gardner's theory of multiple intelligences, it takes more than a high IQ to be a smart manager and leader. An interview by Christopher Koch

2001. "A Mappable Feast" (Page 64)—geographic information systems have found a home in the business community. A State of the Art column by Dennis Hamilton

2002. "Grapes of Wrath" (Page 72)—frame relay and a client/server system liberated the Kendall-Jackson winemakers from the inefficiencies of fax-based inventory management. A Working Smart column by Tam Harbert

MARCH/APRIL 1996 WebMaster

WM26. "Rooms With a View" (Page 34)—Holiday Inn's latest Web projects—from franchisee training to virtual hotel rooms—



are worth checking into. By Leigh Buchanan

WM27. "Art of the State" (Page 44)—government agencies are using the Internet to get up closer and somewhat more personal with their constituencies. By Peter Fabris

WM28. "Lessons From Silicon Valley" (Page 54)—California's high-tech companies had many of the first—and the finest—commercial sites on the Web. By Anne Stuart

WM29. "Easy Doesn't It" (Page 24)—on the Web, the only thing coming to those who wait is likely

to be anonymity. A Customer Interface column by Jim Sterne

WM30. "The Sweet Smell of Access" (Page 28)—the Web has good looks, but it's what's in your database (and whether it's accessible) that counts. A Work in Progress column by Peter L. Brooks

APRIL 1, 1996

2003. "Buy Global, Skip Local" (Page 30)—global sourcing can save multinational businesses time, money and headaches. By Marsha W. Johnston

2004. "Ground Control" (Page 40)—Motorola's Iridium project includes what may be the largest commercial software effort ever undertaken. By Peter Fabris

2005. "High-Wire Act" (Page 46)—Paulsen Wire Rope Corp. is reengineering the IS function to support the company's turnaround. A Second Opinions feature by Christopher Koch

2006. "The CKO and Beyond" (Page 24)—knowledge manage-

ment is all the rage. And it's not just being discussed—it's being done. A Think Tank column by Tom Davenport

2007. "Tactical Maneuvers" (Page 54)—leveraging the IS organization to create business allies was the strategic message delivered at the CIO-sponsored Enterprise Value Retreat. A Reporter's Notebook column by Megan Santosus

2008. "Warehousing Wherewithal" (Page 58)—although vendors may try to convince you otherwise, no one can yet provide one-stop shopping for your data warehouse needs. A State of the Art column by Rob Mattison

2009. "My Data Warehouse" (Page 68)—your excess is our business. A CIO Light column by Tripp Strange

APRIL 15, 1996

Special Section: IT Risk Management

2010. "Taking Your Chances" (Page 36)—new pressures and higher stakes are forcing companies

IS IT US?

SUN ULTRA ENTERPRISE 5000 C/S
11,466 tpmC AT \$191/tpmC

SGI CHALLENGE XL
6,313 tpmC AT \$479/tpmC

DIGITAL ALPHASERVER 8400 SYSTEMS WITH TRUCLUSTER TECHNOLOGY
30,390 tpmC AT \$305/tpmC

HP9000 T500
5,621 tpmC AT \$380/tpmC

to rethink how they justify and oversee IT risks. By Lynda Radosevich and Cheryl Dahle

2011. "A Road Map for Risk" (Page 48)—methodologies point out paths to success and paths fraught with peril. By Carol Hildebrand

2012. "Loud & Clear" (Page 56)—according to management expert Erwin Martinez, the greatest threat to the success of any IS project is a failure to communicate. By Carol Hildebrand



2013. "The Science of Software Development" (Page 62)—faced with shrinking cycle times and the threat of outsourcing, more companies are turning the dark art of software development into a science. By Mickey Williamson

2014. "In the Know" (Page 24)—building a knowledge-sharing database taught Arthur Andersen about implementing changes that fundamentally shift the way a company does business. An Insights column by Wendi Bukowitz

2015. "Client/Server Payoff" (Page 72)—the benefits of client/server projects are many, but they're not always obvious. A Gartner View column by Ken Dec

2016. "Who's Minding the Storage" (Page 78)—it's getting easier and cheaper to store data. A State of the Art column by Daniel Gross

2017. "Torrential Savings" (Page 88)—a water utility turned to client/server technology and in the process realized significant financial benefits. A Working Smart column by Jennifer Bresnahan

MAY 1, 1996

2018. "To Everything, Turn, Turn, Turn" (Page 30)—intercompany IT and increasing trust enable cheaper, faster inventory turns in a variety of industries. By Mickey Williamson

2019. "Enter the Power Elite" (Page 42)—whom do you follow to become a leader? The paradoxical question makes sense for the CIO eager to swing open the doors to the executive suite. By Christopher Koch

2020. "Perfect Pitch" (Page 54)—the art of advertising has gotten more complicated in an era of burgeoning electronic media outlets and fragmenting markets. At last, Madison Avenue is discovering the benefits of IT. By Peter Fabris

2021. "Just Do It All" (Page 64)—to attract customers, a U.K.-based home products chain had to offer more-specialized merchandise and provide superior customer service. A European Spotlight feature by Clive Couldwell

2022. "The New IBM" (Page 24)—how we search for, organize,



share, attend to or ignore information is already the key limiting factor of the InfoAge. A Think Tank column by Tom Davenport

2023. "Seeing the Forest" (Page 72)—product data management systems can be applied enterprise-wide to help employees see beyond their own little neck of the woods. A State of the Art column by Ed Miller

2024. "People Power" (Page 86)—Xerox Corp.'s first foray into client/server computing has reaped financial and personnel gains. A Working Smart column by Carol Zarrow

MAY 15, 1996

**Special Focus:
Outsourcing in the '90s**

2025. "The Art of the Deal" (Page 40)—as outsourcing partnerships become more the rule than the exception, CIOs learn that the give and take continues long after contract negotiations have ended. By Richard Pastore

2026. "The Odd Couple" (Page 52)—an innovative outsourcing deal between Swiss Bank and Perot Systems shows others how to think about the risks and rewards of a new kind of relationship. By Carol Hildebrand

2027. "Hanging Tough" (Page 26)—whether you renegotiate or terminate that aging outsourcing contract, you'll need to plan carefully before confronting the vendor. An Insights column by John K. Halvey and Daniel R. Mummery

2028. "The Provider Paradox" (Page 34)—IS managers cling to the notion that "one-stop shopping" will maximize control of their outsourcing projects, only to discover

that the vendor itself may be ceding control. An Insights column by Stanley Goldman

2029. "Bigger Bang Theory" (Page 64)—Robert G. Cross explains how businesses can squeeze more returns from existing products without downsizing. An interview by Megan Santosus

2030. "Mixed Messages" (Page 72)—results of the seventh annual CIO Magazine/Ernst & Young executive survey. By Jennifer Bresnahan

2031. "Bewitched, Bothered and Bewildered" (Page 82)—integra-

tion offers solutions to the software development crisis. A Gartner View column by Brendan Conway and Richard Hunter

2032. "Getting There From Here" (Page 92)—new technologies transfer information seamlessly back and forth between paper and digital formats. A State of the Art column by John Edwards

2033. "A Hire Standard" (Page 100)—when Stratus Computer discovered its staffing metrics lagged behind the competition, the company turned to client/server. A Working Smart column by Katherine Auer

**MAY/JUNE 1996
WebMaster**

WM31. "Will the Web Eat Your Job?" (Page 40)—with its capacity for directly linking buyers and sellers, the Web is threatening to make lunch out of the middleman. By E.B. Baatz

WM32. "The Cookie-Cutting Edge" (Page 46)—just because pizza ordering hasn't proved practical doesn't mean franchises can't

make good use of the Web. By Fred Hapgood

WM33. "A New Staging Ground" (Page 54)—the John F. Kennedy Center hopes to blend art and commerce on a high-performance Web site. By Leigh Buchanan

WM34. "Getting Personal" (Page 22)—if you're really after loyalty, you'll make your Web site over—one customer at a time. A Customer Interface column by Jim Sterne

WM35. "He Who Staffs Last" (Page 34)—failing to address human resources issues before your site goes up is a big mistake. An Inside Tracks column by Steven M. Dreyer and Isabelle Fymat

JUNE 1, 1996

2034. "Five Uneasy Pieces, Part 2" (Page 34)—while it's true that many companies have reaped great rewards from their investments in knowledge management, outsourcing, customer satisfaction, benchmarking and organizational learning, success requires knowing where the dangers lie.



OR DOES EVERYONE ELSE JUST KEEP GETTING SLOWER?

DIGITAL ALPHASERVER 8400 SYSTEMS WITH TRUCLUSTER TECHNOLOGY (CONTINUED)

2035. "Mastering the Possibilities" (Page 52)—in just five months, MasterCard delivered a data warehouse so that member banks could gain access to data on cardholders' buying patterns. By Tracy Mayor

2036. "Moving the Goods" (Page 62)—logistics once had a simple formula: Manufacture products in long runs and move large quantities in as few shipments as possible. Today it's not so simple. By Peter Fabris

2037. "Light at the End of the Chunnel" (Page 74)—The Franco-British IS crew for the English Channel's Eurotunnel is hard at work on a three-year system reconstruction project. A European Spotlight feature by Marsha W. Johnston

2038. "Finding the Information That Matters" (Page 24)—knowing the most important piece of information in your company can save you megabucks in consulting fees. A Think Tank column by Tom Davenport

2039. "CIOs at the Cybercrossroads" (Page 28)—when technology and business intersect on the in-



formation highway, it's likely to be the CIO who ends up directing traffic. A Reporter's Notebook column by Anne Stuart and Cheryl Dahle

2040. "The Coffee Connection" (Page 84)—can Java supply the jolt organizations need to make truly distributed, networked computing a reality? A State of the Art column by Dennis Hamilton

2041. "A Coordinated Campaign" (Page 96)—Harvard University developed a client/server-based system that coordinates decentralized fund-raising activities. A Working Smart column by Katherine Auer

JUNE 15, 1996

**Special Focus:
SAP Software**

2042. "Ready or Not" (Page 34)—CIOs worry that installing SAP software will blow their budgets—and their careers—to smithereens. But does the problem lie in the software? By E.B. Baatz

2043. "Flipping the Switch" (Page 43)—what's the best way to restructure your company's processes? Three companies take different approaches to implementing SAP. By Christopher Koch

2044. "Banks on Balance" (Page 70)—retail banking is moving out from behind marble counters and glass teller cages into a customer-driven future of made-to-order financial products and swifter service. By Mickey Williamson

2045. "The Enemy Within" (Page 84)—security isn't just an Internet issue. Corporations must figure out how to protect themselves from the inside out. By Anne Knowles

2046. "Six Months in Review" (Page 94)—an index of all major articles published in CIO in the first six months of 1996, including a cross-reference by article type.

2047. "Watch Your Assets" (Page 28)—an asset inventory can supply a basis for drafting budgets, implementing upgrades and supporting users better. An Insights column by Joe Caston

2048. "Stopping the Budgeting Black Hole" (Page 102)—spending for PC LANs these days can become the black hole in the IS budget. A Gartner View column by Dave Cappuccio and Bill Kirwin

2049. "Custom-Tailoring" (Page 112)—customer needs are driving IS priorities like never before, according to the ninth annual CSC survey of critical IS issues. An Outlook column by Robert Savoia

The shattered records indicate that it's actually our UNIX[®] based TruCluster[™]

digital[™]
WHATEVER IT TAKESSM

technology. With it, clustered AlphaServer[™] systems make data warehousing, financial analysis and real-time transactions

roar. With it, critical data stays at the ready. And competitors like Tandem turn green over the savings. With it, your business could have as big a lead over your competitors as we have over ours.*

For more information,

call your Digital

Business Partner or 1-800-DIGITAL (press 4), or visit <http://www.unix.digital.com>.

*TPC-C[™] results for Tandem: 20,918 tpmC at \$1,151/tpmC. ©1996 Digital Equipment Corporation. Digital, the DIGITAL logo, AlphaServer and TruCluster are trademarks and Whatever It Takes is a service mark of Digital Equipment Corporation. TPC is a registered trademark of the Transaction Processing Performance Council. UNIX is a registered trademark in the U.S. and other countries, licensed exclusively through X/Open Company, Ltd. Oracle7 is a trademark of Oracle Corporation. All other products are trademarks or registered trademarks of their respective companies. Digital's TPC results (as of 4/12/96) obtained running 64-bit Oracle7[™] and Oracle Parallel Server on a Digital UNIX TruCluster configuration of four AlphaServer 8400 SMP systems. All other TPC results are as of 4/15/96.

Gartner View: PC LAN Costs

Stopping the Budgeting Black Hole

BY DAVE CAPPuccio and BILL KIRWIN

Spending for PC LANs these days can become the black hole in the IS budget—it's hard to tell where the money is going and harder still to stop it from disappearing at a disturbing pace. To provide enterprises with a framework for assessing and managing IT costs for PC LANs, Gartner Group Inc. has developed an analysis of the total cost of ownership for them. The model includes a base case, or typical set of products and practices, and a best practices case, which suggests ways an enterprise can save a significant amount of money by improving its cost monitoring and vendor choices.

The base case model (see Figure 1) shows that a PC LAN costs about \$11,900 annually per node for hardware, software, support, administrative services and end-user operations. But by following the best practices case suggestions (see Figure 2), IS departments can save up to 26 percent, which represents an annual savings of \$3,100 per node. For a distributed computing environment with 2,500 PCs, that adds up to \$7.8 million each year.

Support and Cost Strategies

One of the best ways IS organizations can manage their cost of ownership is by exercising best practices to reduce support and maintenance costs. The first step is to quantify how much unfunded, underground technical support exists within the enterprise. Don't assume that this unofficial help desk structure is unnecessary. Have IS professionals identify solutions to reduce the *need* for support instead of arbitrarily cutting off the supply. These solutions can run the gamut from technology upgrades to automated services. You can also reduce support demand by identifying trade-offs between capital and labor. You should examine and optimize the IS organization's structure and allocate resources based on the new IT architecture being built, i.e., PCs, LANs and servers. Remember, though, that you may have to spend money in the short term to save money in the long run. Be sure to obtain IS budget funding for initiatives to reduce maintenance costs.

Standards Policies

Standards play an important role in managing support costs, but successful implementation of standards requires that IS follow at least two best practices:

First, IS management must ensure that

standards extend beyond just hardware and software. Standards must be applied to how technology is configured, managed and supported. Standards must also be applied to the processes and procedures used to manage an enterprise networking environment. Particularly in environments with many remote sites, standards and guidelines are crucial to be productive at a reasonable cost.

Second, standards must be strictly enforced where they make sense but altered in situations where they do not. A standard cannot be viewed as an end unto itself. The ultimate goal is organizational effectiveness, not 100 percent conformance. Many standards programs stumble over this point. Standards allow the enterprise to negotiate volume pricing, decrease acquisition processing costs, decrease support and training costs by supporting fewer systems, improve the enterprise's ability to share data and applications, and increase end-user productivity by resolving problems faster.

Enterprises with strong standards policies also have lower total and support costs per user than those with weak enforcement. Standardization helps decrease support costs in a number of other areas: vendor liaisons; product introductions; product reviews; installations, moves and upgrades; and service and preventive maintenance. The key areas to apply standards to are hardware, user interface, applications, infrastructure and processes.

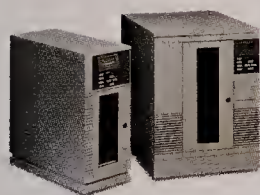
Asset Management

Systematic IT asset management can be a major area of life-cycle cost reduction because it helps ease the financial burden of supporting and tracking hardware (a burden

FIGURE 1: Base Case Summary (per-user costs)

Cost Component	Five-Year PC LAN Cost	Percent of Total
Capital Expenditures	\$12,311	21%
Technical Support	12,393	21%
Administrative	7,477	13%
End-User Operations	27,257	46%
Total	\$59,438	100%
Total Cost Model	Five-Year Cost	Percent of Total
PC	\$43,050	72%
LAN	16,388	28%
Total	\$59,438	100%

NOTE: PC totals include the pro rata cost of laser printing services with one printer per 15 users (the only off-desk cost included).



*Superior automated
back-up and restore
from the world's
largest manufacturer
of 8mm
tape libraries.*

Some things are hard to believe. Like disasters and total data loss. But these things happen; there's documented proof. If it ever happens to you, an Exabyte 8mm tape library will restore your data faster than you can say "mission critical."

Exabyte libraries employ sophisticated technology, like intelligent robotics and multiple drives working in parallel, to ensure fully automated back-up and rapid file retrieval. Our modular, field-replaceable-unit design yields maximum uptime. And when equipped with our new Mammoth drive, a single library can store from 140 gigabytes up to 3.2 terabytes of data at a transfer rate up to 86.4 GB/hr.*

As the leader in 8mm technology, we've designed our libraries to be compatible with 60 software applications across all client/server platforms. And Exabyte is the only manufacturer to design all the components in a family of libraries; these include drives, media and robotics. Our tape library expertise eases integration, assures a clear upgrade path, and delivers superior performance, all at just pennies per megabyte.

Capacity, performance, reliability, and fully automated back-up: It all adds up to peace of mind that's, well, unbelievable.



*Call 1-800-EXABYTE
for your free storage
automation planner.*

EXABYTE® 

<http://www.exabyte.com>

*2:1 compression ©1996 Exabyte Corporation. Exabyte is a registered trademark of Exabyte Corporation, 1685 38th Street, Boulder, Colorado, 80301 USA.

that has increased as the number of desktop components that users require has risen) and can help you avoid the stiff penalties that may accompany software misuse. Enterprises that adopt IT asset management best practices will reap significant savings, and end-user productivity will increase.

Asset management best practices are characterized by a systematic approach to managing IT assets that includes IS department staff, end users performing IS support, IT procurement teams, suppliers, facilities, hardware and software. Effective IT asset management optimizes the use and deployment of all those assets by using total cost-of-ownership metrics when making IT investments.

Asset management best practices begin with a plan to capture hardware and software inventories and each procurement, move and disposal in an enterprisewide database. The database is accessible to all pertinent enterprise organizations; that accessibility increases accuracy and eliminates redundant paper trails. The enterprise IT asset database provides information to increase help desk efficiency and reduce incidents of peer support. The human resources department can plan user training programs, and IT groups can select replacement products to retire unproductive and outdated assets. Knowing the installed base enhances software compliance and procurement negotiations for upgrades. You can also reduce accounting costs by eliminating time-consuming accounts-payable verifications and by facilitating the control of tax payments and reporting requirements.

Vendor Products and Services

You must select best-of-breed vendor products to achieve the greatest cost-of-ownership savings. Significant product areas include the following:

Help Desk Automation Tools: The mission of the help desk is to provide a single point of contact and accountability for rapid resolution of end-user problems. End users must be informed, on an ongoing basis, of the status of their calls. The IS organization cannot maintain control over end-

user computing costs unless "customers" are satisfied. Automated technical support can combine call tracking and problem management with diagnostic technologies such as expert systems, case-based reasoning and decision trees.

Electronic Software Distribution Tools: During a five-year period, software product updating accounts for 55 percent of a desktop system's total cost, but the initial purchase and support account for only 45 percent. An enterprise with 2,000 PCs can spend \$1 million or more annually on only a minimal number of application updates. An effective electronic software distribution package distributes and installs software, and complements those functions with capacity checking, auditing and management reports.

Automated Inventory Tools: An up-to-date inventory of PC hardware and software assets helps an enterprise eliminate duplicate maintenance or software licensing fees, pass down aging computers to appropriate employees when new PCs are purchased, plan a disaster recovery plan and standardize on a handful of PC applications to reduce support costs. Automated inventory systems that track hardware and software assets make taking inventory faster and less expensive.

Software Metering Tools: Software metering tools compile lists of the software used by networked PCs and thus help enterprises purchase the correct number of software licenses. The tools also help to implement license models such as concurrent use, in which the software is distributed to all desktops and licenses are determined according to the number of executions. Metering systems, also called floating license managers, play a complementary role in security and distribution. A server-

based supervisory process controls and tracks requests to execute client and server applications. That allows for the enforcement of limited-use licenses and site licenses.

PC Asset Management Tools: Most PC asset management tools offer only piecemeal help to enterprises. A number of PC inventory tools, for example, take adequate inventory of software on clients and servers, but few can also perform software metering. Likewise, metering tools lack inventory-taking capabilities. A good PC asset management tool must be a multifunction asset management product that will meter usage for software licenses, distribute hardware, track hardware and software inventory, and perform management utilities.

LAN Management Tools: LANs are out of control in many enterprises. Much of what occurs across a LAN is not visible to those who must support it, costs of supporting a LAN are high and increasing, and availability is well below the 99.7 percent that is common in legacy minicomputer and mainframe environments. LAN management tools that integrate the most important daily management functions help to control and reduce the high costs of PC LAN management.

Remote Access to User Client PCs and Server Consoles: When systems are distributed, the most difficult part of management is inspecting those systems and performing maintenance. In a networked environment, most activities can be performed by automation or operator commands. Consequently, managers with responsibility for LAN operations should have remote access capabilities so that they can inspect systems quickly. Remote access tools enable a manager to open a session on systems in the network, run programs and diagnostics, and inspect and alter files.

FIGURE 2: Base Practices Case Summary (per-user costs and savings)

Five-Year PC LAN Total Cost of Ownership				
Cost Component	Base Case	Best Practices	Savings	Percent Savings
Capital Expenditures	\$12,311	\$11,808	\$503	4%
Technical Support	12,393	10,180	2,213	18%
Administrative	7,477	5,530	1,947	26%
End-User Operations	27,257	16,261	10,996	40%
Total	\$59,438	\$43,779	\$15,659	26%

IMPROVE YOUR BOTTOM LINE



KR BUSINESSBASESM FOR ALL YOUR BUSINESS INTELLIGENCE NEEDS

When you need business information, turn to KR BusinessBase for instant, online access to accurate, up-to-date information on companies, markets, products and topics.

KR BusinessBase is a powerful Windows®-based application that gives you direct, personal access to today's most valuable corporate and business information on over 13 million public and private companies—right from your desktop. No specialized information searching skills are necessary.

And with its simple point-and-click interface, KR BusinessBase gives you the information you

need to make decisions faster and more efficiently, keep tabs on your competition, accelerate your business planning cycles, reduce your time to market, and much, much more!

Built-in search intelligence brings you the answers you need when you need them. And KR BusinessBase always has information you can depend on, because it's based on DIALOG®, the world's premier online service, with access to thousands of publications and business sources.

So improve your bottom line...with KR BusinessBase.

**CALL TODAY for a FREE Quick Tour Diskette and find out
how to get a no-risk trial of KR BusinessBase.
1-800-334-2564, 1-415-254-8800 or <http://www.krinfo.com>**

KR BUSINESSBASESM
KNIGHT-RIDDER INFORMATION

©1996 Knight-Ridder Information, Inc., 2440 W. El Camino Real, Mountain View, CA 94040
All Rights Reserved. DIALOG is a service mark (registered U.S. Patent and Trademark Office) and KR BusinessBase is a
service mark of Knight-Ridder Information, Inc. Windows is a registered service mark of Microsoft Corporation.

System Requirements: 486 IBM PC or compatible, Windows 3.1 or higher, 8 MB RAM, 9600 baud modem or higher or TCP/IP connectivity.

Data Backup and Restoration:

When performed manually, a backup wastes time and equipment. It also leads to lost, misplaced and stolen backup media. The LAN design should include bandwidth and storage to be used for scheduled full and incremental backups. The backup process should automatically report problems or failures to the event monitor and help desk and, at the same time, implement hierarchical storage management methods that provide more efficient online storage use.

The Rewards Are Worth the Effort

The Gartner Group PC cost-of-ownership model is based on a typical Type B enterprise (a mainstream adopter of technology) with 2,500 PCs running the Windows 3.1 operating system in a campus environment. According to the model, the five-year total cost of ownership of a PC in such an environment rose to \$41,439 in

1995 from \$19,296 in 1987.

The model also shows that end-user time spent on non-job-related PC activities accounts for 50 percent of a PC's total cost, and more than 60 percent of IT expense resides outside the IS organization.

Gartner Group's midsize LAN model shows that the total five-year cost per user is \$16,388, or an average annual cost per user of \$3,275.

PC LAN figures were calculated by combining the PC and LAN models and then compared on the basis of

typical-case and best-case scenarios (see Figure 3). The comparison found that enterprises can save more than \$3,100 annually per node by using best practices. For 2,500 users, the savings can exceed \$7.8 million annually, or \$39 million over five years. Overall, the 26 percent savings over the basic case amounts to a significant chunk out of that black hole. **CIO**

Dave Cappuccio can be reached at dave.capp@gartner.com. Bill Kirwin can be reached at wkirwin@gartner.com.

FIGURE 3: Best Practices Savings Summary

Savings Attribution (\$)	PC	LAN	PC LAN
Corporate IS Organization	\$4,731	\$1,707	\$6,438
Vendor Products	5,163	4,058	9,221
Total	\$9,894	\$5,765	\$15,659
Savings Attribution (%)			
Corporate IS Organization	11%	10%	11%
Vendor Products	12%	25%	15%
Total	23%	35%	26%

Note: PC totals include the pro rata cost of laser printing services with one printer per 15 users (the only off-desk cost included).

Imagine . . . software so powerful, its benefits get your picture on the cover of CIO (see April 1 issue)

Imagine . . . software so powerful, you can bet the future of your company on it.

Ahh . . . SEER-SEM makes your dreams come true.

If you manage software development projects, you need SEER-SEM!

"When we at Motorola needed an estimating tool for the Iridium Program, we researched the market for the best available product. We chose the SEER family of parametric estimating tools..."

-R. Bailey, Motorola Satellite Communications

For more information: call, fax, write, E-Mail or visit our www site.



G A SEER Technologies
Division of Galorath Associates, Inc.

PO Box 90579, Los Angeles, CA 90009
Phone: 310-670-3404
Fax: 310-670-6481
E-Mail: info@gaseer.com
Web Site: <http://www.gaseer.com>

Corporate Hosts



WEBMASTER

P E R S P E C T I V E S

C O N F E R E N C E



SURFING THE BUSINESS POTENTIAL

Executive conference for senior information executives

and webmasters responsible for evaluating and

leveraging the World Wide Web and the Internet for

competitive gain and internal productivity benefits.

<http://www.cio.com> ■ 1-800-355-0246

WESTIN ST. FRANCIS

SAN FRANCISCO, CA

AUGUST 11-14, 1996



Name: Donald R. Riley **Title:** Associate Vice-President for Academic Affairs **Company:** University of Minnesota **IT Budget:** Approximately \$37 million *"Although our problems are not exactly the same as those of the major corporations, there is much overlap. CIO is a window to what's going on in the corporate world—one that is very helpful to me."* **IT Responsibilities**

How does the University of Minnesota make the grade? By concentrating on IT.

- Plans/coordinates all academic computing and IT
- Oversees approximately thirty mainframes and servers, electronic mail, and news services
- Provides distrib-

utive computer and PC support, hardware/software demonstrations, network services, classroom technology, distance education delivery, on-campus support for over 20,000

Internet Protocol addresses **IT Purchase Involvement** • Approves purchasing for central systems and public labs • Coordinates purchasing with libraries • Manages & supports site licenses • Recommends vendors to various decentralized departments **Large & Mid-Range**

Systems • IBM ES9000s, VAX Clusters, OEMs, MIPS processors, and one Cyber • Client/server systems: IBM RS600s and SUNs. • ATM pilots underway **End-User Computing** • 1500 UNIX

workstations: SUN, Silicon Graphics, and IBM RS600s. • HP and Deskwork stations • 12,000-13,000 Macs and PC compatibles • E-mail and Internet • In-house software for the PC

Windows and Mac environments • **If you want to reach** an influential audience of 80,000 information executives like Donald, make sure *CIO* is at the

top of your media buy. For readership demographics and advertising information, call 508-935-4040.



THE MAGAZINE FOR INFORMATION EXECUTIVES

*One person with a checkbook
is worth 50 people with opinions.*



I N D E X

Page numbers refer to the first page of the article(s) in which the company is mentioned. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

Company Index

Accugraph Corp.	43
Advantis	16
Air Products and Chemicals Inc. ...	34
Andersen Consulting	43
Autodesk Inc.	34, 43
Bankers Trust Co.	84
Boardroom Inc.	16
Business@Web	34
Camelot Corp.	16
Citibank NA	70
Computer Associates Intl. Inc.	16
Computer Sciences Corp.	112
Conference Board, The	16
Deloitte & Touche LLP	43
Eastman Kodak Co.	16
E.I. du Pont de Nemours & Co.	43
Eloquent Technology Inc.	16
Entropic Research Laboratory Inc. ...	16
Ernst & Young LLP	16
First National Bank of Chicago	70
Ford Motor Co.	16
Fujitsu Microelectronics Inc.	43
Gartner Group Inc.	102
Hercules Inc.	43
IBM Corp.	16
InfoWorld Publishing Co.	16
Intel Corp.	84
Internet Security Corp.	84
Maxit Corp.	43
Microsoft Corp.	16, 34
Mobil Corp.	84
Motorola Inc.	16
Netphonic Communications Inc.	16
Northern Telecom Ltd.	84
Ohio Carbon Blank	16
Owens Corning	43
Pacific Gas and Electric Co. ...	34, 43
Positive Support Review Inc.	16
Salem Five Cents Savings Bank ...	70
SAP AG	34, 43
SAP America Inc.	34, 43
Seattle Times Co.	43

Securix Inc.	84
Sheshunoff Information Services Inc.	70
Stratus Computer Inc.	16
Sweetheart Cup Co.	84
Time Inc.	16
VocalTec Inc.	16
Wells Fargo & Co.	70

Advertiser Index

Acxiom Corp.	11
Amdahl Corp.	29
Ameritech (Regional)	73
Angel Group, The	25
ANS Core Systems Inc.	81
Antares Alliance Group	4
Ascend Communications Inc.	20
Bay Networks Inc.	23
Border Network Technologies Inc. ...	31
Cabletron Systems Inc.	C4
CIO Communications Inc.	16A, 17, 73, 95, 107, 108
Cisco Systems Inc.	63
Clear Software Inc.	14
CommVault Systems	3
Computer Associates Intl. Inc.	44
Comshare Inc.	37
Cubix Corp.	55
Dell Computer Corp.	8
Digital Equipment Corp.	98
EMC Corp.	C3
Encore Computer Corp.	77
Ernst & Young LLP	67
Exabyte Corp.	103
GA Seer	106
Hewlett-Packard Co.	53
IBM Corp.	56, 68
Interleaf Inc.	92
Knight-Ridder Inc.	105
Maintech.	91
Mercury Interactive Corp.	59
Microsoft Corp.	32, 60, 82
Minolta Corp.	65
NCR Corp.	15
NetSolve Inc.	79
PeopleSoft Inc.	12
Procom Technology Inc.	89
SAP/Hewlett-Packard Co.	87
SAS Institute Inc.	19
Sequent Computer Systems Inc.	7
Siemens Rolm Communications Inc.	50
Softex	111
Sony Corp.	26
Sun Microsystems Inc.	47, 49
Symbios Logic Inc.	40
Unisys Corp.	C2
Xerox Corp.	39, 75, 97

Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-0080. **Postal Information:** CIO (ISSN 0894-9301) is published semimonthly; monthly in July and August; and as a combined issue December 15/January 1 by CIO Communications Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Periodicals postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1996 by CIO Communications Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: ‡. **Subscriptions:** Address inquiries to CIO, 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208. CIO is free to qualified information executives. To all others the one-year basic rate is \$98 for U.S. and Canada, \$110 to foreign countries (payable in U.S. funds only). The single copy price is \$8. Please allow 4 to 6 weeks for new subscriptions to begin. **Change of Address:** Please fax a copy of current subscription label along with new address to (508) 872-8506. Allow 4 to 6 weeks for change to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.

CIO Sales Offices

President and Group Publisher

JOSEPH L. LEVY
508 935-4601

Senior VP/Sales

MICHAEL J. MASTERS
201 244-5510

EAST COAST

Regional Director/Advertising Sales

FRANK S. GENOVESE
201 244-5505

District Manager/Advertising Sales

EILEEN HENKE
201 244-5507

Account Executive

KIRSTIN L. PIHL
201 244-5511

Advertising Sales Associate

MARLENE M. LEVIS
CIO Communications Inc.
30 Two Bridges Road, Suite 110
Fairfield, NJ 07004
201 227-1140, FAX 201 227-1565

NEW ENGLAND

Regional Manager/Advertising Sales

LEN GANZ
508 935-4039

Advertising Sales Associate

CAROLYN CONNAUGHTON
508 935-4092
CIO Communications Inc.
492 Old Connecticut Path, PO Box 9208
Framingham, MA 01701-9208
508 872-0080, FAX 508 872-0618

SOUTH CENTRAL

Regional Manager/Advertising Sales

ROBERT E. SAWDON

Advertising Sales Associate

DEBBIE LIVELY
CIO Communications Inc.
5495 Beltline Road, Suite 240
Dallas, TX 75240
214 239-5736, FAX 214 239-5734

NORTH CENTRAL

Regional Manager/Advertising Sales

KEITH KENNER

CIO Communications Inc.
Willow Hill Executive Center
540 Frontage Road, Suite 2245
Northfield, IL 60093
847 441-5005, FAX 847 441-5150

Advertising Sales Associate

DEBBIE LIVELY
CIO Communications Inc.
5495 Beltline Road, Suite 240
Dallas, TX 75240
214 239-5736, FAX 214 239-5734

WEST COAST

Regional Director/Advertising Sales

GERALD E. PARSONS
415 693-1987

Regional Manager/Advertising Sales

RICHARD BASTAS
415 693-1988

Advertising Sales Associate

JODY NAGY
CIO Communications Inc.
220 Montgomery Street, Suite 1120
San Francisco, CA 94104
415 398-8200, FAX 415 398-4649

LIST SERVICES

List Services Manager

STEPHANIE LEGELIS
508 935-4433

List Services Assistant

KATE DAVEY
508 935-4072
CIO Communications Inc.
492 Old Connecticut Path, PO Box 9208
Framingham, MA 01701-9208
508 872-0080, FAX 508 872-8506

CIO is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 276 computer publications in over 75 countries. Ninety million people read one or more International Data Group publications each month. International Data Group's publications include: **Argentina:** Anuario de Informatica, Computerworld Argentina, Infoworld, PC World Argentina; **Australia:** Australian Macworld, Client/Server Journal, Computer Living, Computerworld, Computerworld 100, Digital News, Network World, On-line World Australia, PC World, Publishing Essentials, Reseller, WebMaster; **Austria:** Computerwelt Österreich, Networks Austria, PC Tip; **Belarus:** PC World Belarus; **Belgium:** Data News; **Brazil:** Anuário de Informática, Computerworld Brazil, Connections, Super Game Power, Macworld, PC World Brazil, Publish Brazil, SUPERGAME; **Bulgaria:** Computerworld Bulgaria, Networkworld/Bulgaria, PC & MacWorld Bulgaria; **Canada:** CIO Canada, Client/Server World, ComputerWorld Canada, InfoCanada, Network World Canada; **Chile:** Computerworld Chile, Informatica Chile, PC World Chile; **Colombia:** Computerworld Colombia, PC World Colombia; **Costa Rica:** PC World Costa Rica/Nicaragua; **The Czech and Slovak Republics:** Computerworld Czechoslovakia, Elektronika Czechoslovakia, PC World Czechoslovakia; **Denmark:** Communications World, Computerworld Denmark, Macworld Denmark, PC Privat Denmark, PC World Denmark, PC World Denmark Supplements, TECH World; **Dominican Republic:** PC World Republica Dominicana; **Ecuador:** PC World Ecuador; **Egypt:** Computerworld Middle East, PC World Middle East; **El Salvador:** PC World Centro America; **Finland:** MikroPC, Tietoverkko, Tietoviiikko; **France:** Distributique, Golden, Hebdo-Distributique, Info PC, Le Guide du Monde Informatique, Le Monde Informatique, Reseaux & Telecoms; **Germany:** Computer Partner, Computerwoche, Computerwoche Extra, Computerwoche Focus, I/M Information Management, Macwelt, PC Welt; **Greece:** GamePro, Multimedia World; **Guatemala:** PC World Centro America; **Honduras:** PC World Centro America; **Hong Kong:** Computerworld Hong Kong, PCWorld Hong Kong, Publish in Asia; **Hungary:** ABCD CD-ROM, Computerworld Szamitastechnika, PC & Mac World Hungary, PC-X Magazine; **Iceland:** Tolvuhelmutur/PC World Island; **India:** Information Systems Computerworld, PC World India, Publish in Asia; **Indonesia:** InfoKomputer PC World, Komputek Computerworld, Publish in Asia; **Ireland:** ComputerScope, PC Live!; **Israel:** People & Computers; **Italy:** Computerworld Italia, Computerworld Italia Special Editions, Macworld Italia, Networking Italia, PC Shopping, PC World Italia, PC World/Walt Disney; **Japan:** Macworld Japan, Nikkei Personal Computing, Open World Japan, OS/2 World Japan, SunWorld Japan, Windows World Japan; **Kenya:** East African Computer News; **Korea:** Hi-Tech Information/Computerworld, Macworld Korea, PC World Korea; **Macedonia:** PC World Macedonia; **Malaysia:** Computerworld Malaysia, PC World Malaysia, Publish in Asia; **Mexico:** Computerworld Mexico, Macworld, PC World Mexico; **Myanmar:** PC World Myanmar; **Netherlands:** Computable, Computer! Totaal, LAN Magazine, LanWorld Buyers Guide, Macworld, Net Magazine, Totaal! Beurskrant; **New Zealand:** Absolute Beginner's Guide, Computer Buyer, Computer Industry Directory, Computerworld New Zealand, E2 Electronic Entertainment, MTB, Network World, PC World New Zealand; **Nicaragua:** PC World Costa Rica/Nicaragua; **Nigeria:** PC World Nigeria; **Norway:** CAD/CAM World Norge, Computerworld Norge, Computerworld Privat (Datamagasinet), CW Rapport Norge, IDG's KURSGUIDE, Macworld Norge, Multimediaworld, PC World Ekspress, PC World Netverk, PC World Norge, PC World's Produktguide, Windows World Spesial; **Pakistan:** Computerworld Pakistan, PC World Pakistan; **Panama:** PC World Panama; **P.R. of China:** China Computer Users, China Computerworld, China Infoworld, China Telecom World Weekly, Computer & Communication, Electronic Design China, Electronics Today, Electronics Weekly, Game Camp, Game Soft, Network World China, PC World China, Popular Computer Weekly, Software Weekly, Software World, Telecom World; **Peru:** Computerworld Peru, PC World Profesional Peru, PC World Peru; **Poland:** Computerworld Poland, Computerworld Special Report, Macworld, Network, PC World Komputer; **Philippines:** Computerworld/Correio Informático, MacIn/PCIn, Multimedia World Asia; **Portugal:** Cerebro/PC World, Computerworld/Correio Informático, MacIn/PCIn, Multimedia World Portugal; **Puerto Rico:** PC World Puerto Rico; **Romania:** Computerworld Romania, PC World Romania, Telecom Romania; **Russia:** Computerworld Russia, Mir PK, Sety; **Singapore:** Computerworld Singapore, PC World Singapore, Publish in Asia; **Slovenia:** MONITOR; **South Africa:** Computing S.A., InfoWorld S.A., Network World S.A., Software World; **Spain:** Computerworld España, COMUNICACIONES WORLD, Dealer World, Macworld España, PC World España; **Sweden:** CAP&Design, Computer Sweden, Corporate Computing, MacWorld, Maxi Data, MikroDatorn, Nätverk & Kommunikation, PC/Activ, PC World, Windows World; **Switzerland:** Computerworld Schweiz, Macworld Schweiz, PCTip; **Taiwan:** Computerworld Taiwan, Macworld Taiwan; **PC World Taiwan;** Publish Taiwan; **Windows World;** **Thailand:** Thai Computerworld, Publish in Asia; **Turkey:** Computerworld Monitör, MACWORLD Türkiye, PC Games, PC WORLD Türkiye; **Ukraine:** Computerworld Kiev, Computers & Software, Multimedia World Ukraine, PC World Ukraine; **United Kingdom:** Acorn User, Amiga Action, Amiga Computing, Appletalk, Computing, GamePro, Lotus, Macaction, Macworld, Network News, Parents and Computers, PC Advisor, PC Home, PSX Pro UK, The WEB; **United States:** Cable in the Classroom, CD Review, CIO Magazine, Computerworld, Computerworld Client/Server Journal, Digital Video Magazine, DOS World, Federal Computer Week, GamePro, InfoWorld, I+Way, JavaWorld, Macworld, Maximize, Multimedia World, Netscape World Online, Network World, PC Entertainment, PC World, Publish, SunWorld Online, SWATPro Magazine, Video Event, WebMaster; **Uruguay:** PC World Uruguay; **Venezuela:** Computerworld Venezuela, PC World Venezuela; and **Vietnam:** PC World Urrug.



“Visiting SoftEx allowed my organization to effectively focus on evaluating available software products at one time. SoftEx maximized our most valuable resource: key personnel time and effort.”

The Unique Software Demonstration Event



in Accounting & Finance

New York Hilton and Towers
New York, NY

July 23 – 24 1996

Palmer House Hilton Hotel
Chicago, IL

September 11 – 12 1996

SPONSORED BY:

**MANAGEMENT
ACCOUNTING**



*The Magazine
for Information
Executives*

**CLIENT/
SERVER**
COMPUTING
SOFTWARE

CFO
THE MAGAZINE FOR SENIOR EXECUTIVES

CONTROLLER
MAGAZINE

If you are looking for accounting and finance software, SoftEx is the Event that has all the answers.

Where else can you compare and evaluate over 70 leading accounting and finance software products in one valuable day? And gain such a wealth of information to ensure you make the right decisions now for your company's future?



your Event Planner, details of the MasterClass Educational Program and lodging information.

**Pre-register now
at no charge*!**

Remember to quote
CIAF6b and indicate your
city of choice to receive



Tel: 1-888-8-SOFTEX toll-free
Tel: 1-415-842-7373 (Outside USA)



Email: 74722,425@compuserve.com



Fax on demand 1-888-2-SOFTEX toll-free
for immediate details direct to your fax machine.



<http://www.softinfo.com>

* \$95.00 fee day of show if not pre-registered.

Fax coupon to **1-888-5-SOFTEX toll-free**

Name _____	
Organization _____	
Address _____	
City _____	State _____
Zip _____	Phone _____
Fax _____	E.mail _____
Please tick City of choice ☐ New York ☐ Chicago	

CIAF6b

Custom Tailoring

Customer needs are driving IS priorities like never before, according to the ninth annual CSC Survey of IS critical issues.

During the past five years or so, businesses have responded to competitive challenges by reengineering their operations to cut costs and improve efficiencies. However, midway through the 1990s, an increasing number of companies recognized that being competitive means more than becoming lean and nimble. Reengineering can also benefit the customer in a way that will provide sustainable competitive advantage in coming years.

This shift in focus is evident in the results of the ninth annual "Critical Issues of Information Systems Management" survey conducted by Computer Sciences Corp.'s Consulting and Systems Integration unit in Waltham, Mass. Overall, the responses from the 346 North American IS executives surveyed reveal that the corporate goal with which IS is aligning itself involves learning more about what customers want and fulfilling those needs more completely. For example:

- "Organizing and utilizing data" finished second this year on the list of top IS issues, up from fourth in 1993 and third in both 1994 and 1995. This rise has been driven primarily by executives' demands to have better and faster access to meaningful corporate data—particularly information on customer demographics and purchasing trends—which has resulted in the emergence of data warehousing as a popular customer-focused tool.

- The principal motivation for companies to outsource some aspect of their technology capability is, surprisingly, to improve customer service. Previously, such decisions were driven predominantly by cost considerations.

- Most systems development projects now being conducted are directed toward applications to sup-

port the customer service and sales functions, and nearly one-quarter of respondents said the most significant benefit they hope to realize from their development effort is improved customer service.

Many CIOs participating in the survey believe that achieving support for customer-related strategies is dependent upon improving both intra- and interenterprise productivity and collaboration through information networks. For example, technology infrastructure improvement initiatives currently in progress at more than half the respondents' companies involve "enhancing or developing information networks," and the three most critical technologies being used in infrastructure initiatives are wide and local area networks and client/server.

The picture painted by this year's respondents is not entirely rosy. Nearly 40 percent of respondents said their company had replaced its senior-most IS executive in the past year, and CIOs still report being stymied by budget and cost constraints and lack of top management's

commitment to IT. Yet, spending is up—the overall budget increased by 5.4 percent, compared with a reported 4.6 percent increase last year.

Today's CIOs are being asked to move beyond IS management issues and address how technology can change markets, invent business opportunities and generate competitive advantage—a fact made abundantly clear by the big jumps that "capitalizing on advances in IT" and "using IT for competitive breakthroughs" made this year on the critical issues list. Accordingly, CIOs must balance the realities of "ground-level" concerns, such as preparing their systems for the year 2000 and supporting customer service efforts with a Magellan-like attitude for discovery of the future. But if senior IS executives can strike such a balance, the CIO function could become fun again. **CIO**

By Robert Savoia, a vice president in the Consulting and Systems Integration unit of Computer Sciences Corp. in Waltham, Mass. For a complimentary copy of the survey, call 800 272-0018.

Top Management Issues for 1996

ISSUE	RANK				
	1996	1995	1994	1993	1992
Aligning IS and corporate goals	1	1	2	2	1
Organizing and utilizing data	2	3	3	4	4
Instituting cross-functional information systems	3	2	4	4	6
Using IT for competitive breakthroughs	4	13	15	15	14
Integrating systems	5 (tie)	16	8	11	13
Capitalizing on advances in IT	5 (tie)	15	13	14	19
Connecting to customers or suppliers	7	7	16	16	20
Updating obsolete systems	8	9	7	8	18
Creating an information architecture	9	8	5	7	3
Implementing business reengineering	10	4	1	1	2

SOURCE: COMPUTER SCIENCES CORP.



digitalTM

YESSM



Data General
Bringing Common Sense to Computing

HITACHI
Experience. The Difference.

EMC²
THE STORAGE ARCHITECTS

Almost All Computer Companies Sell Storage.

How Come The Leader In Storage Doesn't Sell Computers?

The most competitive companies in the world have two things in common. They're organizing their entire business around their information, doing anything and everything they can to leverage it into smarter, more powerful decisions and strategies.

And they're recognizing information storage as business-critical and then treating it as a separate purchase. In other words, buying it from EMC, the world leader in high-performance storage solutions. Unlike typical computer company storage, EMC intelligent storage lets you do a lot more than just store. It consolidates all your information and keeps it online close, immediately accessible across the entire enterprise, regardless of how many different computers or servers are involved. Or how many times they change.

If you'd like to find out how EMC can help your company bring products to market sooner, respond to customers and new opportunities faster and give indispensable support to your overall growth and profit strategies, call 1-800-424-EMC2, ext 217. Or visit us at <http://www.emc.com>.



Free To Do More.

SPECTRUM[®]

FOR OPEN SYSTEMS

MANAGING THE intranet AND BEYOND

In the Space Station Payload Operations Integration Center, located at NASA's Marshall Space Flight Center, network management is administered by Cabletron System's SPECTRUM Enterprise Management software.

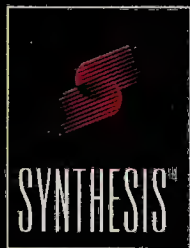
When it came to choosing a new management platform, SPECTRUM met NASA's requirements - which are not unlike those adhered to by many of today's *Fortune* 500 businesses:

Commercially available, enterprise-wide network management software that integrates through multiple platforms and devices, and keeps to a minimum the number of people needed to oversee network operations.

Sylvia Clark, analyst with the Aberdeen Group points out, "NASA's choice of SPECTRUM comes as no surprise. SPECTRUM's scalability and distributed architecture cannot be matched by the competition. SPECTRUM is, in many important ways, the industry leader in network management."

It's that simple.

To learn more about SPECTRUM, please call (603) 332-9400, or e-mail to sales@ctron.com.



The stuff **intranets** are made of

CABLETRON
SYSTEMS
The Complete Networking Solution™

35 Industrial Way
Rochester, NH 03867
(603) 332-9400
Internet: <http://www.cabletron.com/>

